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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

HEAD

Costen, J. B.: Neuralgias and Ear Symptoms Associated with Disturbed Function of the Temporomandibular Joint. *J. Am. M. Ass.*, 1936, 107: 252.

Costen reports his findings in 125 cases of a syndrome associated with damage to the mandibular joint due to pressure from unilateral loss of molar tooth support. He found that ear symptoms predominate in patients with edentulous mouths whose symptoms develop slowly as the result of pressure on the eustachian tubes, and that pain, with or without herpes of the external canal and buccal mucosa, predominates in cases of natural malocclusion or malocclusion from loss of molar support on 1 side only. Of the patients studied, 89 were more than 40 years of age and the largest group were between the ages of 50 and 60 years.

The ear symptoms were an intermittent or continuous impairment of hearing; a "stopped-up" sensation in the ears; tinnitus; a snapping noise during mastication; a dull or "drawing" pain within the ears; and dizziness with nystagmus. The pain and irritative symptoms were headache about the vertex and occiput and behind the ears; a burning sensation in the throat, the tongue, and the side of the nose; dryness of the mouth with almost total absence of saliva or, rarely, excessive saliva; and occasional herpes of the external ear canal and buccal mucosa which was most marked on the edentulous side.

When molar teeth are missing or the vertical dimension of the jaw is abnormally reduced by shrinkage of the alveolar ridge beneath plates or by grinding away of the natural teeth the mandibular joint assumes an unaccustomed burden and much of its structure is destroyed.

In the reviewed cases the most common symptom was headache. Sixty-three of the patients had a daily headache. The distribution of pain was quite typical of posterior sinus disease. Anatomical causes suggested for the pain were: (1) erosion of the bone of the glenoid fossa and impaction of the condyles against the thin bone separating them from the dura; (2) irritation, by the uncontrolled movement of the condyles backward or mesially, of the auriculotemporal nerve which is distributed over the temporal and vertex region; and (3) irritation by the condyle of the chorda tympani nerve where it emerges from the tympanic plate at the mesial edge of the glenoid fossa.

Twenty-two of the patients complained of pain and sensory disturbances about the lateral pharyngeal wall and in the tongue. The evidence is convincing that malocclusion and destruction of the mandibular joint play an important part in the causation of glossopharyngeal neuralgia through irritation of the auriculotemporal and chorda tympani nerves acting reflexly on the lingual and glossopharyngeal nerves. In 18 of the 22 cases of burning tongue this disturbance was completely relieved by reposition of the jaw. Herpes and salivary disturbances appear to be irritative phenomena associated with the pain.

On x-ray examination, erosion of the head of the condyle on its anterior surface and to a less extent on the articular eminence is the usual finding.

The vertical dimension of the jaw is corrected and the pressure on the joint relieved by having the patient wear thin cork disks between the molar teeth on the affected side for a period of from 2 days to 1 week. The results of reposition of the jaw were generally good except in a few cases of malocclusion of natural teeth. However, in the cases showing the best results the correction was done in several stages, the vertical dimension of the jaw being increased slowly.

ROBERT H. IVY, M.D.

Figi, F. A.: The Treatment of Angioma of the Face. *Arch. Otolaryngol.*, 1936, 24: 271.

The most effective procedures for the treatment of hemangioma of the face are, in the order of their usefulness, radium irradiation, electrocoagulation, excision, and the injection of sclerosing substances. Ligation of the afferent vessels and various plastic procedures are frequently carried out to supplement these measures. The application of carbon dioxide

snow, electrodesiccation, cauterization, the introduction of subcutaneous sutures, roentgen therapy, ultraviolet irradiation, and the application of collodion have a much more limited field. While the results obtainable with these forms of treatment vary greatly, the choice of therapy is usually determined largely by the experience of the clinician with any one or group of them.

At present, radium is generally considered the most effective agent for dealing with hemangioma, especially hemangioma of the face. The use of radium spread rapidly as it yielded results far superior to those obtained with other therapeutic measures. At the Mayo Clinic this form of therapy was used almost exclusively in the treatment of hemangioma from the time of its introduction in 1913 until 1924, when electrocoagulation was first employed. No other agent or procedure used there has given as satisfactory results in the treatment of angioma in children. However, electrocoagulation has largely supplanted radium therapy in the treatment of cavernous angioma in adults, as such a tumor can usually be shrunken or scarred down more rapidly by electrocoagulation and therefore fewer treatments are required.

In the treatment of angioma, radium may be employed: (1) in a surface pack, with distance and screening, (2) in a plaque or in tubes applied directly to the surface of the lesion, and (3) in needles or as radon seeds implanted into the tumor.

At the Mayo Clinic, young children with a cavernous angioma on the face measuring several centimeters or more in diameter are usually treated with radium packs. The dose ranges from 2,000 to 3,000 mgm.-hr., and the treatment is repeated at intervals of from 3 to 4 months. The number of treatments depends on the response. In the cases of adults, similar lesions of the face can usually be taken care of more satisfactorily by electrocoagulation or excision, with or without ligation of the efferent and the afferent vessels. In addition, radium needles or small tubes containing small amounts of radium are inserted directly into the tumor through a short incision in the adjacent normal skin along the skin folds. As a rule, 10-mgm. needles of radium element are used, and from 1 to 6 or more are implanted for periods of several hours, depending upon the situation and extent of the growth and whether or not it has been treated previously. This procedure is carried out under strict asepsis as secondary infection greatly increases the severity of the reaction.

When a radium plaque is used it contains from 5 to 25 mgm. of radium element. The plaque is most effective in the treatment of capillary angioma. Covered with a rubber finger cot, it is kept moving constantly and uniformly over the surface of the angioma for from several minutes to an hour or longer, depending upon the size of the lesion, the intensity of the discoloration, and whether treatment has been given previously.

Electrocoagulation has greatly improved the results of treating cavernous angioma in adults. Often the growth can be eradicated by this method with comparatively little scarring, whereas repeated applications of radium when the patient is mature frequently accomplish little. A special electrode which was devised at the Clinic is used. It consists of a rigid steel wire several centimeters in length, sharpened at one end and insulated, except for about 3 mm. at its sharpened end, with vulcanite, duco cement, or some other non-conductor of electricity. This is thrust into the deeper portion of the tumor directly through the overlying skin. The current is then applied and the desired degree of electrocoagulation is carried out. The chief difficulty is in gaging the intensity and the extent of the coagulating process. Usually a slight change in the color of the tumor over an area adjacent to the electrode from the normal blue or violet-blue to a somewhat lighter shade indicates a sufficient degree of coagulation. However, when a tumor has been treated previously, especially by irradiation, this change is not reliable and sloughing may follow what has appeared to be only moderately intensive therapy.

While surgical excision has been supplanted to a great extent by radium therapy and electrocoagulation in the treatment of angioma of the face, in certain cases hemangioma can be dealt with more satisfactorily by surgical excision. This is true especially in many cases of capillary angioma, particularly cases of portwine stain which have been treated unsuccessfully with radium.

At the Mayo Clinic epitheliomas which have developed in the dense scar left by radium treatment of a capillary angioma or a mixed capillary and cavernous angioma have frequently been observed. Often it has been necessary to remove the malignant area immediately and widely and to delay consideration of the remnant of the angioma until later. Excision by cautery or thorough electrocoagulation of the area of activity has usually been carried out.

The injection of a sclerosing substance is becoming increasingly popular in the treatment of angiomas, and in the course of time will probably supplant some of the older methods of therapy.

Öhngren, G., Woodman, M., Patterson, N., Allchin, F. M., and Others: Discussion of Malignant Disease of the Upper Jaw. *Proc. Roy. Soc. Med.*, Lond., 1936, 29: 1497.

ÖHNGREN said that those who treat malignant tumors in the maxillo-ethmoidal region experience so many disappointments that they finally become willing to accept any method of treatment that seems to be followed by fewer recurrences than other methods even though it may present great technical difficulties. In the course of time they become also less inclined to attach much importance to the aesthetic aspect of the results.

He reported that he has abandoned the usual operation with knife and scissors in favor of endothermy, in spite of the great inconveniences associated with the latter. Among these inconveniences are the prolonged course of healing, the objection-

able odor, and the tendency toward late hemorrhage. Among the advantages are the possibility of treating cases that are not suitable for resection because of the extent of the disease, the mildness of postoperative shock, a low postoperative mortality, and the fact that the heat developed can kill the tumor cells even at some depth below the coagulated tissue surface.

In preparation for electro-endothermy the infection in the oral cavity should be decreased by removing decayed teeth and cleansing the tonsils of infective secretion so far as possible. If the blood sugar is too high it should be reduced to the normal.

The endothermy has been carried out partly under regional anesthesia and partly under general narcosis induced either by intravenous injections of evipan or with chloroform. If the tumor involves the antrum and the ethmoid, the external carotid artery is ligated above the point of origin of the superior thyroid artery. Ligation with catgut is not always reliable because of the strong pressure caused by the pulsation in the artery. During the endothermy treatment it is important to avoid touching the tumor before the cells have been killed by coagulation. The entire tumor should be removed at one time. For coagulation at the cribriform plate, in the nasopharynx, and in the sphenoid, wide opening of the operative field is necessary. Öhngren uses an incision which passes along the median line of the upper lip into the nostril on the affected side, and thence subcutaneously along the pyriform aperture and in the gingival fold to the last molar tooth.

In cases of tumor of the antrum endothermy must be adapted to the way in which the tumor has attacked the different walls of the antrum. After freeing the skin of the face from the anterior wall of the maxillary sinus, Öhngren exposes the wall to intense heating before opening the antrum from the canine fossa. With one electrode in the antrum and the other in the nasal cavity, the tumor and the mucous membrane of the walls are cooked and scraped away so that the underlying bone is exposed. In all cases the anterior and the medial walls of the maxillary cavity are completely removed in order to permit inspection of the exposed bone in the remaining inferior, posterior, and superior walls.

The frequency with which, in past years, tumors of the antrum have recurred in the region of the pterygoid process and in the nasopharynx directed attention to the lymphatic vessels. It seems to be of great importance to destroy these by coagulation in every case of tumor in the antrum and the ethmoid. If the bone of the floor of the antrum is broken through, Öhngren cooks and removes the whole hard palate. If possible, the soft palate is left. If the bone of the orbital floor is destroyed and the tumor shows advanced growth into the orbit, no attempt is made to preserve the eye; the orbit is completely cleared. If the bone of the posterior wall is broken through, the lymph vessels in the pterygomaxillary fossa and the infratemporal region may be the site of cancerous lymphangitis, and all of this area must be destroyed by coagulation and evacuated. It is not usual for difficulties to arise from hemorrhages from the internal maxillary artery if the external carotid is ligated beforehand. In evacuating ethmoidal tumors Öhngren cooks the mucous membrane in the nasopharynx and sphenoidal sinus, for although it presents a normal appearance to the eye, the microscope frequently shows that it contains incipient tumor deposits.

Since 1927 the majority of his patients have been treated also with high-voltage x-rays usually with filtration equivalent to 2.6 mm. of copper. Daily doses of ¼ to ⅓ H. E. D. are given to different fields in turn. The fields are selected so that a cross-fire against the area affected by the tumor will be obtained. Since 1929 the teleradium apparatus containing 3 gm. of radium has been used to irradiate the tumor from 6 or 7 different ports. The total amount of irradiation has varied from 30,000 and 70,000 mgm.-hr. The distance from the radium containers to the skin has been 6 cm., and the total filtration equivalent to 6 mm. of lead. The postoperative irradiation is given along the same lines as the pre-operative treatment. Relatively small x-ray or teleradium doses are given and often repeated in 2 or 3 series at intervals of about 3 months. In cases of suspicious enlargement of regional lymph glands the postoperative treatment is directed mainly to the neck. Teleradium is used instead of x-rays. The application of radium at the operation, although of proved benefit, is not without disadvantages as it is apt to cause extremely protracted osteonecrosis and greatly reduce the ability of the tissues to heal. In the treatment of the metastases in the neck in cases of maxillary tumor, irradiation alone has given better results than irradiation combined with block dissection.

WOODMAN stated that the classical incision has long ago been abandoned. An incision through the mucosa of the lower eyelid has been found more satisfactory. However, while this prevents a depression beneath the lower eyelid and subsequent edema, it leaves a deformity in the angle of the eye. If the growth is low in the alveolus it may be reached easily from the oral aspect by turning back the mask of the face or by an incision made along the side of the nose, beneath the nostril, and vertically through the upper lip, which makes it possible to turn aside the lower half of the face. The postnasal space is packed off. The operation is carried out with the patient sitting up and without ligation of the external carotid. Starting in the eyebrow, the incision passes down the side of the nose and through the lip. The eye is turned well out. Generally Woodman uses an ordinary scalpel for the incision down the side of the nose. He obtains good results from the use of radium in the mouth, but questions whether radium is of much value in the upper jaw.

PATTERSON called attention to the fact that symptoms and signs may be entirely absent in cases of malignant tumor of the upper jaw. An inflammatory process may closely simulate malignant dis-

ease and vice versa, and in some cases the 2 conditions may be associated. Every patient suspected to have a malignant tumor of the upper jaw should be carefully examined for areas of anesthesia in the skin or mucous membranes supplied by the second division of the trigeminal nerve. There may be complete anesthesia over the cutaneous area supplied by the infra-orbital nerve, or only a small patch of anesthesia or hyperesthesia. Similar changes in sensitivity may be found in the mucous membrane lining the roof of the mouth. If the disease extends high up in the nose, the nasal branch of the ophthalmic nerve may become compressed. In the majority of cases Patterson prefers to combine ordinary surgery with diathermy. He stated that a skin incision should be made: (1) when the growth appears to involve the floor of the orbit; (2) when the ethmoid is apparently involved; and (3) when the tumor is suspected to have penetrated the bone and involved the deeper tissues of the cheek. When the growth is confined to the roof of the mouth or has invaded the lower part of the nose or antrum there is no advantage in an external incision and the operation should be carried out entirely through the mouth. No attempt should be made to close the opening by plastic methods. A good obturator can always be fitted by a competent dental surgeon.

Wood stated that she uses 2 1-gm. radium units together, 1 on each side. After completion of the external irradiation the hard palate on the side of the growth is removed and a local application of radium is made to the interior of the antrum. The applicator is mounted on an upper denture with a projection which fills the antrum. It is into this projection that the radium is placed. By careful distribution of the radium in the applicator a homogeneous dose can be delivered without causing osteonecrosis. Wood emphasized the value of beginning the treatment of tumors of the upper jaw by external irradiation. By this means such regression of the growth is often brought about that removal of the hard palate alone, followed by electrocoagulation of the walls of the antrum and the local application of radium, is sufficient to yield a successful result. An extensive operation is thereby avoided and external incision rendered unnecessary.

Cade said that for the differentiation of carcinoma from sarcoma originating in the antrum histological examination is necessary. For small-celled or large-celled sarcoma of the antrum the ideal treatment is roentgen irradiation alone. In cases of carcinoma the dangers of irradiation are increased by the presence of sepsis, inadequate access, and insufficient drainage. The method which Cade has used for 10 years is fenestration through the mouth, removal of the hard palate, and the application of radium by means of dental appliances. He states that the danger of radium necrosis after this procedure is no greater than that associated with diathermy. In cases of malignant tumor of the upper jaw, irradiation combined with surgery is slightly more beneficial than either irradiation alone or surgery alone.

Joseph K. Narat, M.D.

EYE

Davidson, M.: The Minor Sequelæ of Eye Contusions. *Am. J. Opth.*, 1936, 19: 757.

Major eye injuries and their late complications are seldom untreated and seldom disputed in compensation adjustments. Minor eye contusions, often masked by the superficial lesions, and minor sequelæ have not received sufficient attention. Frenkel, in a series of articles published during and since the war, reported the only systematic attempt to deal with these minor sequelæ.

The material studied was taken from the 2,700 cases of eye injuries examined in 1935 at the Bureau of Workmen's Compensation in New York City. Intra-ocular pathological changes were found in 15 per cent of the cases, and in one-third of these were due to contusions.

In order to gain a clear conception of minor contusions and their sequelæ and of the validity of Frenkel's anterior-segment traumatic syndrome, 34 cases were selected for tabulation. The oculists' reports and C-5 forms rarely contained more than summary diagnoses and the principal findings. The cases were seen months or years after the injury, and the observations of the sequelæ are those of the author.

All anterior segment findings recorded are those made with the slit lamp and microscope, but transillumination of the iris by the diapupillary method with the slit lamp and unaided eye was found more satisfactory than with the microscope because the brightness of the fundus reflex is much reduced when examined with the microscope. That it is a fundus reflex and not, as is often stated in books on slit-lamp microscopy, a reflection from the lens is obvious from the fact that the tranlucent areas are red whether the lens is cataractous or not and whether the iris defect is limited to the pigment layer or traverses the entire thickness. In transillumination of the pupillary border of the iris reflection from the lens occurs and the translucent border is not red.

Brown deposits on Descemet's membrane were noted only once and do not form part of the contusion syndrome except in the presence of a complicating uveitis. Their frequent presence in iritis and uveitis, particularly the chronic and senile types, has acquired the significance of a differential diagnostic sign. They are smaller and darker than those seen in the vitreous. Their origin is probably pigment-laden phagocytes rather than retinal pigment.

The most frequent sequela of eye contusions is traumatic mydriasis. The pupil is most commonly D-shaped. It is sluggish in reaction to light and in convergence, and reacts poorly to mydriatics and miotics. Sphincter tears being rare, application of

the term "paralytic mydriasis" to the condition is misleading. Since both sphincter and dilator are involved, the best term is "traumatic iridoplegia." Traumatic iridoplegia was present in 85 per cent of the cases studied.

Another frequent sequela of eye contusions is the occurrence of dehiscences of the iris pigment layer. These are single or multiple and vary in shape. They correspond to Fuch's peripheral dark zone, where the iris is thinnest. The lesion is an incomplete rudimentary iridodialysis in which the paresis of the dilator suggests that both the retinal and dilator layers are involved. Iris lesions are found in 50 per cent of all cases and so-called sphincter tears in only 15 per cent. Other conditions in which iris transillumination occurs must be considered in the differential diagnosis.

Lens lesions (opacities and subluxations) were noted in 60 per cent of the cases studied. The most frequently observed lesion is the small, tenuous, somewhat striated anterior subcapsular opacity. Other contusion opacities are the transient posterior cortical, permanent posterior capsular, and coronary opacities, equatorial "riders," the late anterior cortical rosette, and the late total traumatic cataract.

Retrolenticular pigment particles were noted in 56 per cent of the cases. These are large and bright red, and easily distinguished from the smaller, dull-brown granules seen after vitreous hemorrhage.

Minor sequelæ are often noted in the fundal periphery and at the fovia. The minor fovial whitish or pigment stippling and the parafovial yellowish or slightly pigmented small patches are best seen by indirect ophthalmoscopy. They may be present with 20/20 vision, and are frequently overlooked. Peripheral traumatic lesions seldom reported were found in 58 per cent of the cases studied.

As a rule Frenkel's conception of the anterior-segment traumatic syndrome was justified by the presence of from 2 to 6 lesions anatomically related to each other which extended from the iris root along the lens equator, zonule, ciliary body, ora serrata, and vitreous. Frenkel's idea of the backward displacement and rebound of the lens on an equatorial axis is supported by slit-lamp observation of the sequelæ. The anterior-segment traumatic syndrome is more common than the posterior-segment syndrome and is not often complicated by posterior-pole lesions. The latter were found in only 20 per cent of the reviewed cases. EDWARD S. PLATT, M.D.

Fuchs, A.: Some Anatomical Details of Importance in Ocular Surgery. *Arch. Ophth.*, 1936, 16: 341.

Among the anatomical structures discussed by Fuchs are Bowman's membrane and Descemet's membrane.

Bowman's membrane is developed embryologically from the outermost layer of the corneal lamellæ. Hence it is very intimately associated with these lamellæ and cannot be readily dissected from the stroma. Descemet's membrane, being an outgrowth of the endothelium, is not firmly attached to the stroma and can be separated from it easily. Because of these facts, regeneration of Bowman's membrane is impossible, whereas Descemet's membrane can be formed again from the endothelium.

Descemet's membrane is more resistant to external influences than are the other corneal tissues.

Bowman's membrane resembles elastic tissue whereas Descemet's membrane is extremely elastic. This is evident on examination of anatomic preparations of injured corneas. The margin of Descemet's membrane curls up and, in the vicinity of the wound, it wrinkles, whereas in Bowman's membrane these phenomena do not occur.

Descemet's membrane is easily detached by fluids, infiltrates, and tumors, and by instruments used at operation. Detachment resulting from surgical procedures is not very harmful clinically. Detachment of Descemet's membrane is especially frequent during cyclodialysis as the spatula is held as close as possible to the sclera and cornea, and on meeting resistance from the membrane the surgeon proceeds to overcome it. The ease with which Descemet's membrane becomes detached is evident particularly in Soderman's operation for ulcus serpens.

One of the unpleasant complications of the Elliot trephination, which may or may not be harmful, occurs when the fluid oozes through the trephine opening but the iris does not protrude. The surgeon cannot cut the iris, but if he leaves the opening as it is and covers it with the prepared flap of conjunctiva a good result may often be obtained. However, a few days later the iris may protrude through the opening and prevent fistulization. The iris must then be cut away. Such a condition is explained thus:

1. The trephine may be placed so that its peripheral rim lies outside the margin of Descemet's membrane while its central rim lies within the membrane.

2. The root of the iris may have become adherent to the pectinate ligament and to the posterior surface of the cornea, as in cases of long-standing glaucoma.

Descemet's membrane is much more resistant to chemical influences than the cornea or Bowman's membrane. LESLIE L. MCCOY, M.D.

Gifford, S. R.: Surgical Treatment of Retinal Detachment. *Arch. Ophth.*, 1936, 16: 405.

Gifford says that undoubtedly the greatest advance made in clinical ophthalmology during the past twenty years was Gonin's operation for retinal detachment. In 1904, Gonin advanced the theory that the tears or holes found in detached retinas were the cause of the detachment. With improvement in his methods more cases have been found suitable for operation and better results have been obtained.

Modifications of the operation are the chemical cauterization employed by Guist and by Lindner, the flat coagulation of the sclera by Larssen, and

the use of carbon dioxide snow by Bietti. In certain cases Weve employed microcoagulation, using a fine needle inserted just through the sclera and choroid as an active electrode and a current of 50 ma. The coagulation was repeated until the carefully localized hole was entirely surrounded. Escape of fluid through the numerous punctures allowed the eye to become rapidly soft.

To meet this condition, Šafář devised a set of short pins with buttons, both single and multiple, which were inserted, treated with the proper current, and left in until the operation was complete, when all were removed and the fluid was allowed to escape.

American ophthalmologists are more familiar with the pins devised by Walker. These have several advantages as they can be sterilized, they are easily applied, and the application can be made far back on the globe. Two more recent methods are diathermy with a pyrometric electrode, as carried out by Coppez, and electrolysis as employed by von Szily and Machemer and by Vogt.

Gifford has used the Šafář method with Walker's pins for the past three years. In a number of cases he has considered the condition inoperable because the detachment was over six months old and good results are exceedingly infrequent after that length of time. In numerous cases old age of the patient was considered a contra-indication to the operation, especially if the other eye was in good condition. Also excluded from the treatment were a few cases in which a recurrence had followed an operation of another type.

Gifford emphasizes that every attempt must be made to find the retinal hole or holes, and that maximal dilatation of the pupil is important. A good pre-operative night's rest must be assured. He obtains this by giving the patient 1½ gr. of phenobarbital or phenobarbital sodium. For the relief of pain and the prevention of postoperative vomiting he has found dilaudid (1/32 gr.) most satisfactory.

Atropin sulphate is instilled for a number of days before and on the morning of the operation. One drop of a 2 per cent solution of butyn is instilled before scrubbing and irrigation of the eye, and this is followed by the deep injection of procaine hydrochloride. During the operation frequent ophthalmoscopic control is necessary. After the operation almost complete immobility of the head for the first four days is essential. In the author's cases in which the detachment is above, the foot of the bed is raised slightly for the first four days, and in those in which the detachment is below, the back rest is raised 15 degrees or more. The first dressing is done after four days, but both eyes are kept closed and the patient is kept in bed for two weeks. At the end of two weeks a small hole in the shield or hole glasses are allowed. The patient is permitted to go home after from three to four weeks. After from six to eight weeks a pair of lenses frosted except for center areas of from 4 to 6 mm. are substituted for the hole glasses.

The results in the author's relatively small series of cases, while not so good as those reported by Weve and Šafář, agree fairly well with those in most other series of cases, such as those of Veil and Dollfus, Knapp, Walker, and Dunnington and MacNie. They indicate what the results should be in an average series. Gifford believes that improvement in the results may be expected from increased experience and especially from wider recognition of the fact that detachment of the retina is a surgical condition which should be operated upon at the earliest possible moment. LESLIE L. MCCOY, M.D.

Walker, C. B.: The Surgical Treatment of Separated Retina by the Galvanic Method. *Am. J. Ophth.*, 1936, 19: 558.

The author describes his modifications of Vogt's technic for the treatment of separated retina by the galvanic method. Instead of placing the anode on the sclera, he applies it under the patient's shoulder. He employs an apparatus with which galvanic or diathermy currents may be used according to the requirements of the individual case.

SAMUEL A. DURR M.D.

EAR

Guild, S. R.: Hearing by Bone Conduction: The Principles of Transmission by Sound. *Ann. Otol., Rhinol. & Laryngol.*, 1936, 45: 736.

The author states that in hearing by bone conduction the important pathway by which the sound waves reach the inner ear is osseous rather than osseotympanic.

The terminal part of the osseous pathway which is of most importance consists of the osseous trabeculæ that connect the medial part of the posterior wall of the external auditory canal to the inferolateral aspect of the horizontal semicircular canal (called in this article the "subaditus trabeculæ).

This osseous pathway is of more importance than are the other osseous pathways to the inner ear because of the direction from which, and the place at which, the sound waves passing by way of the subaditus trabeculæ enter the intralabyrinthine fluids.

Lesions of this important pathway for the conduction of sound waves to the inner ear cause impairment of the threshold of hearing by bone conduction. JAMES C. BRASWELL, M.D.

NOSE AND SINUSES

Beck, J. C., and Guttman, M. R.: Basaloma or So-Called Cylindroma of the Air Passages. *Ann. Otol., Rhinol. & Laryngol.*, 1936, 45: 618.

The authors call attention to a rare group of tumors occurring in the mucosa of the respiratory tract and its adnexa which run a characteristic clinical course and have a unique histologic structure. They state that while in the past there has been some disagreement as to the histogenesis and

classification of these neoplasms it is probable that they are mucosal basal-cell growths which run a course comparable to that of basal-cell tumors originating in the skin. The term "cylindroma" is descriptive of their morphological character, but they are probably more correctly termed "cylindromatous basalomas."

Histologically, they present the picture of cell nests surrounded by a connective tissue stroma. The cell nests frequently show a central lumen containing a pink-staining material and sometimes cellular débris. Clinically, like their counterparts in the skin, the tumors are slow growing, invasive, and locally destructive. They do not metastasize, but recur repeatedly after removal. They are relatively radiosensitive. They are possibly best treated by extensive resection or irradiation.

The authors add 3 cases to the 37 they have found in the literature. In 1, the tumor originated in the antrum; in 1, in the sphenoid; and in 1 in the trachea. JAMES C. BRASWELL, M.D.

MOUTH

Haentzschel, K.: The Eugenic Significance of Congenital Clefts of the Lip, Jaw, and Palate (Die eugenische Bedeutung der angeborenen Spaltbildungen im Bereiche von Lippe, Kiefer, und Gaumen). 1935: Leipzig, Dissertation.

This monograph is based on very extensive studies, observations, and follow-up investigations made in 128 cases of cleft lip, jaw, and palate. The studies date back to 1910. The material was obtained from various localities and from various hospitals with as many different methods of operation.

It was found from the start that facial clefts are the most common of all congenital deformities. In 20.4 per cent of the cases the factor of inheritance in ascent or descent could be demonstrated. It is to be assumed that the condition was hereditary also in the remaining 80 per cent as there is no possibility of referring the occurrence of facial clefts to other causes and these clefts are very often combined with other hereditary defects. The deformity varies in degree. Therefore, in an investigation of the cause, certain forms such as the so-called healed intrauterine cleft palate, a cleft-like defect in the bone which can be distinguished only by palpation of the roof of the mouth, are easily overlooked. The theory that such defects may result from psychic trauma (fright from a dog and the like) has been definitely disproved. The deformity is congenital and not of amniotic origin. The inheritance is polymeric and recessive. Thirty-five and one-tenth per cent of all cases show additional anomalies and deformities, especially a slight degree of congenital feebleminded-ness. The latter eugenically dangerous defect occurs in 11.7 per cent of persons with clefts. In such persons it is therefore 8 times as frequent as in the general population. Moreover, the relatives of one-fifth of all persons with cleft defects are affected through heredity by nervous diseases, epilepsy, or feeblemindedness.

Regardless of the time of operation or the technic employed, the average operative result in all forms is only fair. The result depends upon the patient himself, as his will and intelligence will determine the improvement of speech. Good speech was attained in only about 7 per cent of the reviewed cases. Follow-up investigations showed also that failures in school and in business life were due to the associated deficiencies. They showed, further, that the incidence of marriage is independent of the severity of the deformity or the success of operative treatment, and that more than half of the married patients with clefts were married to definitely inferior partners.

All forms of cleft formation, from the slightest cleft lip to the pronounced cleft of the hard palate, must be considered hereditary afflictions. Operative correction cannot overcome the pathological hereditary tendency.

In conclusion the author says that as the theory of hereditary genesis must be regarded as valid in all cases, sterilization of all individuals with clefts should be demanded.

(GERLACH). ROBERT H. IVY, M.D.

Searby, H.: The Treatment of Carcinoma of the Tongue. *Med. J. Australia*, 1936, 2: 210.

Searby states that in the great majority of cases of carcinoma of the tongue the cause of death is glandular metastases. There is no evidence that irradiation therapy is effective against glandular metastases, but there is abundant evidence that, in some cases, surgical excision, properly performed, can either prevent their occurrence or cure them. Cure depends upon their extent and fixity.

Surgical excision can cure primary lesions in the tongue when the principles of cancer surgery can be followed. When the anatomical situation of the lesion is such that these principles cannot be followed, and for the avoidance of mutilation when they can be followed, it is necessary to rely on the selective destructive effects of radium for cure of the primary growth.

It seems that, in appropriate dosage, radium is capable of producing a remarkable disappearance of the outward signs of carcinoma of the tongue when surgical excision cannot be considered.

Every case must be regarded as an individual problem. There can be no fixed rule for treatment.

Searby urges the removal of all teeth prior to any form of treatment in the mouth, radiological or surgical, as this will prevent most of the troubles of infection. ROBERT H. IVY, M.D.

Tailhefer, M. A.: End-Results of Surgical Treatment of Adenopathies in Cancer of the Tongue (Traitement chirurgical des adénopathies du cancer de la langue. Résultats éloignés). *Mem. de l'Acad. de chir.*, Par., 1936, 62: 977.

The author reviews 83 cases of cancer of the tongue in which surgical removal of cervical glands

was done. In general, the tongue cancers were treated with radium needles. The neck dissection included exeresis of the submaxillary gland, the sternocleidomastoid muscle, and the internal jugular vein. It was performed, on the average, three weeks after the radium treatment of the tongue, and was always unilateral (a manifest error in some cases). Whenever histologic examination showed invasion of the glands by the cancer the operation was followed by supplementary radium treatment.

The incidence of glandular invasion and the results were as follows:

	Patients with glandular invasion
19 complete cures of tongue and cervical region	
17 patients living	10
2 patients dead from intercurrent disease after five years	2
64 failures	
3 operative deaths	3
4 deaths from intercurrent disease before five years	2
4 recurrences, sites undetermined	3
19 glandular recurrences, tongue cured	
10 on side operated upon	10
6 on opposite side	6
3 bilateral	3
19 lingual recurrences (glandular region apparently cured, in 3 cases for more than two years)	11
15 glandular and lingual recurrences	
13 on side operated upon	11
2 on opposite side	2
6 distant metastases	6
	69

The author concludes that the incidence of cure can be increased if glandular dissection is done early and is performed on both sides of the neck when this is indicated by the site or extent of the primary lesion. ROBERT H. IVY, M.D.

Holmes, M. J.: A Statistical Tabulation of the Results of Treatment of Carcinoma of the Tongue. *Med. J. Australia*, 1936, 2: 203.

The tabulations presented by the author, 14 in number, were made from figures supplied by 8 large hospitals located in the 6 largest cities of Australia which, for a number of years, have used a uniform system of recording cases of cancer and have carefully followed up patients after their discharge. This system of recording and following up was begun in 1929 after the distribution of Commonwealth radium. The tabulations of results of treatment cover the period from 1929 to 1932.

The cases have been classified anatomically according to the extent of involvement into the following 4 groups:

1. Those of carcinoma limited to the tongue, without clinical evidence of involvement of the regional lymph nodes.

2. Those in which the carcinoma involved the tongue and the floor of the mouth but there was no clinical evidence of lymph-node involvement.

3. Those with clinical evidence of involvement of regional lymph nodes secondary to the carcinoma of the tongue.

4. Those in which the carcinoma had extended from the tongue and floor of the mouth to neighboring bone.

Of the patients treated only by radium irradiation of the tongue, none of 3 survived after seven years; 2 of 15 survived after six years; 3 of 15 survived after five years; 4 of 17 survived after four years; and 7 of 14 survived after three years.

In the first and second stages of the disease the number of patients treated by surgery alone is relatively small and the results do not appear to be so favorable as those obtained by irradiation alone or by irradiation combined with surgery.

The combined figures for all methods of treatment show that, of 112 patients treated in the first or second stage of the disease, 32 (28 per cent), and of 168 treated in the third or fourth stage of the disease, 12 (7 per cent), were alive from three to six years later.

Of the 47 patients treated in the first stage who have died, 12 (25 per cent) were free from evidence of recurrence or secondary extension at the time of death. In the cases of 18 (40 per cent) the primary lesion had healed and death was due to secondary extension. Therefore in the cases of 65 per cent of the patients who have died the treatment was of appreciable benefit although death resulted. Of the 146 patients treated in the third or fourth stages of the disease who have died, 61 died either without recurrence or secondary extension or as the result of secondary extension after healing of the primary lesion. Although treatment may prolong life only a year or two, it greatly relieves the pain.

In conclusion the author urges close collaboration between the surgeon and radiologist as in many cases the best prospects of successful treatment are offered by a suitable combination of surgery and irradiation. ROBERT H. IVY, M.D.

PHARYNX

Richards, G. E.: The Radiological Treatment of Cancer: Methods and Results. III. Malignant Lesions of the Tonsil and Its Pillars. *Canadian M. Ass. J.*, 1936, 35: 385.

This report is based on 42 cases of carcinoma and 10 cases of sarcoma involving the tonsil or its pillars. Of the patients with carcinoma, 17 are living, of whom 15 are free from symptoms; 2 died of extraneous disease without recurrence of the malignant growth; 21 died of cancer; and 2 cannot be traced. Of the patients with sarcoma, 5 are living and 5 are dead.

On the basis of the pathological findings alone it appears that in cases of carcinoma the prognosis is most favorable when the lesion is of the basal-cell type, next most favorable when the lesion is of the transitional type, and least favorable when the lesion is of the epidermoid type, which is the most

common type. Of the reviewed cases of sarcoma, all of the successful results were obtained in those of lymphosarcoma.

In the method of treatment used by the author at the present time the initial treatment consists of a carefully planned course of teleradium therapy (4-gm. radium bomb) which includes the primary lesion and the entire area of regional lymphatics and is pushed to the point of satisfactory tissue reaction in both the tonsillar region and the skin. In the majority of cases the primary lesion heals with no visible scarring. When it fails to do so, radium is applied locally by the interstitial method with the use of highly filtered needles. In cases without glandular involvement and those in which palpable glands disappear following the treatment described, no surgery is undertaken, but the patient is kept under careful periodic observation and the irradiation treatment is repeated as a prophylactic measure. If involvement of glands fails to disappear following the first course of teleradium therapy, dissection of the neck is done, provided the primary lesion has been controlled or is responding favorably, and is followed by as intensive postoperative radiotherapy as the skin is able to tolerate without an undue reaction.

JOSEPH K. NARAT, M.D.

NECK

Cimino, S.: Malignant Epithelial Tumors of the Thyroid Gland (Sui tumori epiteliali maligni della tiroide). *Tumori*, 1936, 22: 385.

Cimino states that in cases of malignant tumor of the thyroid gland the histologic findings are often very complex and certain metastatic manifestations may be very difficult to interpret. Therefore the diagnosis is often not made early and adequate treatment cannot be instituted. Furthermore the physiopathological features of malignant neoplasms occurring in the thyroid gland are only incompletely known.

The author reports 3 cases. The first was that of a woman thirty-two years old who, one year previously, had first noticed a swelling in the right anterolateral region of the neck which became larger during menstruation. Under local anesthesia induced with percaine the right lobe and the isthmus of the thyroid gland were removed. Histological examination revealed a tumor with the structure of a solid alveolar carcinoma. The epithelial cells were markedly polymorphic. Some were cylindrical and others cubical. They had a granular cytoplasm and an eccentrically placed nucleus. A few mitotic figures were present. The cells were arranged irregularly. In some places there were cords of cells which anastomosed with one another in a reticulum-like arrangement. The patient was of the bradymorphic-vagotonic type with an average basal metabolic rate of +18.

The second case was that of a woman forty-two years old who, seven years previously, had noticed a small swelling of the neck which gradually became larger. Histological examination of the surgical specimen showed papillomatous structures and complete absence of normal thyroid tissue. The epithelial lining of the papillæ was single- or multilayered. The cells were cylindrical or cubical and had a rather clear protoplasm which toward the free pole sometimes presented a few granulations with a large median or basal nucleus and well-staining chromatin. The tumor was a solid papilliferous epithelioma.

The third case was that of a woman forty years old. Examination of the surgical specimen revealed the presence of a papilliferous epithelioma of the cystic unilocular type. The papillæ protruded into the cystic cavity whereas the outer lining was smooth. The patient was of the dolichomorphic-sympathicotonic type with symptoms of hypermobility, psychic hyperesthesia, muscular tremors, hypertension, and loss of weight. The basal metabolic rate was +38.

The author states that the functional condition of the gland may be judged from the blood-sugar curve. In the first case the blood-sugar curve was normal whereas in the third case glycemia was present even in the fasting condition.

Cimino discusses the histological and physiopathological features of malignancies of the thyroid gland in the light of the recent literature.

RICHARD E. SOMMA, M.D.

Jackson, C., and Jackson, C. L.: Acute Laryngotracheobronchitis. *J. Am. M. Ass.*, 1936, 107: 929.

Acute laryngotracheobronchitis occurs most often and is most severe during epidemics of so-called influenza. In from 3 to 5 per cent of the cases the influenza bacillus seems to be the cause and occasionally other organisms are responsible, but in over 90 per cent of the cases the condition is primarily or secondarily of streptococcic origin. The mortality in children under 3 years of age is about 70 per cent.

In laryngismus stridulus the mucosa is lavender, violet, or grayish, but otherwise normal, and the discoloration quickly disappears when the airway is laryngoscopically held open. It is suggested that the attacks may be due to the inspiration of pharyngeal secretions during sleep, following which the sudden and violent efforts to inhale draw in the laryngeal orifice in a sphincteric closure.

In diphtheria limited to the larynx and tracheobronchial tree there is a fibrinous exudate which, objectively, is very different from the inflammatory exudate seen in streptococcic infection of the same mucosal areas.

In acute laryngotracheobronchitis the outstanding feature is bronchial obstruction by inspissated secretion which the patient is unable to expel because of weakness or absence of the cough reflex. Therefore in the treatment of the condition the following facts are of importance:

1. The routine administration of atropine and opium derivatives is illogical in theory and often fatal in practice.

2. The superheating of the air in hospitals and homes favors the inspissation of secretions. Outside air at zero contains little water even at the dew point. When this air is heated to 70 degrees F. it becomes extremely desiccating to the secretions and almost caustic to the mucosa. The air surrounding the patient with laryngotracheobronchitis with inspissating secretions should be humid to saturation.

3. An impaired percussion note and increased respiratory rate usually mean, not pneumonia or bronchopneumonia, but obstructive atelectasis and call for peroral or tracheotomic aspiration of the secretions. In extreme cases, forceps removal of crusts is the only means of saving life. Such potentially fatal conditions can be prevented by humid air and the avoidance of atropine, opiates, and other desiccating medicaments. SAMUEL KAHN, M.D.

Cardi, G.: A Case of Pachydermia of the Larynx with Neoplastic Development (Sopra un caso di pachidermia del laringe a sviluppo tumorale). *Tumori*, 1936, 22: 363.

In 1852, Rainier observed that, as the result of chronic inflammation, the stratified squamous epithelium of the pharynx, epiglottis, interarytenoid space, and vocal cords may undergo histopathologic changes which are strikingly similar to those observed in the skin. In their course these processes present themselves mainly in 2 forms, one characterized by the luxuriant production of epidermoid epithelium which often becomes keratinized, and the other characterized especially by involvement of the connective tissue. To these and similar processes Virchow gave the name "pachydermia."

The case of pachydermia of the larynx reported by Cardi was that of a man sixty-seven years old who was a heavy smoker. When the patient was seen in the clinic his voice was hoarse and he complained of a burning pain in the larynx. Laryngoscopic examination revealed, slightly above the left vocal cord, an ovoid mass about the size of a small nut which had a whitish, irregular, and papillomatous surface. The vocal cords appeared normal and vibrated freely. The mass was removed under novocain anesthesia.

Histologic examination showed the tissue to be made up essentially of epithelial elements derived from the mucosal lining. The epithelial lining had been transformed into aggregations of prickle cells down to the level of the basal layer. In some areas the hyperplasia was more pronounced and the epithelial layer was thicker, giving the surface of the tumor a verrucoid aspect. However, the main portion of the neoplastic growth was made up of spinous elements among which were eosinophiles. Mitoses were almost absent, and no epithelial pearl formation was observed. In some areas there were masses of cells perforated by a cavity of irregular form within which were small blood vessels containing the elements of normal blood.

After reviewing the literature, the author discusses the relationship between pachydermia and carcinoma. Most investigators seem to agree that pachydermia is a precancerous lesion, but Cardi rejects this theory. RICHARD E. SOMMA, M.D.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS; CRANIAL NERVES

Cramer, F.: The Clinical Diagnosis of the Tumors of the Corpus Callosum. *Bull. Neurol. Inst. New York*, 1936, 5: 37.

The author reports 6 cases of verified tumor of the corpus callosum. The diagnostic symptoms of such neoplasms appear to be apraxia and "mental signs." It is important to recognize apraxia in all its forms. Apraxia should be considered present when there is a markedly inadequate or incorrect performance of usual purposeful acts by muscle groups in which the potential ability to function is normal or nearly normal. This may be observed in ocular, facial, faucial, glossal, truncal, and appendicular functions.

The "mental signs" consist of a disturbance of consciousness which varies from inattention and apathy to stupor and coma. In the reported cases, decompression by dehydration relieved the drowsiness, but failed to change the patient's appearance of marked reduction of consciousness. The effect was therefore quite unlike the usual effect of such treatment in cases of stupor resulting from a generalized increase of intracranial pressure. It appears that the anatomical location of the tumor rather than the intracranial pressure is responsible for the disturbance of consciousness.

DAVID J. IMPASTATO, M.D.

Cohen, I.: Neoplastic Cysts Communicating with the Lateral Ventricles. *Bull. Neurol. Inst. New York*, 1936, 5: 21.

Neoplastic cysts communicating with the lateral ventricles are not frequent. Air injected by the lumbar route fills the cysts and renders them visible. In Cohen's 2 cases the lateral ventricles were dilated but not displaced. The spinal fluid is bloody or xanthochromic because of bleeding into the cysts. According to the author, these communicating cysts do not cause ventricular displacement because the pressure within them is the same as the pressure in the ventricles.

DAVID J. IMPASTATO, M.D.

Franklin, C. R.: Visual Studies in Pituitary Adenoma. *Bull. Neurol. Inst. New York*, 1936, 5: 180.

An analysis was made of the visual findings in 28 verified cases of pituitary adenoma in an effort to determine the factors of importance in the diagnosis and in the prognosis as regards postoperative vision.

In 4 of the cases the tumor was a chromophil adenoma; in 4, an adenoma of a mixed type; in 11, a chromophobe adenoma; in 6, a cystadenoma; and in 3, a simple adenoma. The operative mortality was 28 per cent. In 21 cases there was bitemporal hemianopia; in 2, homonymous hemianopia; in 3, blindness of one eye with temporal hemianopia in the other; and in 2, general contraction of the fields.

Failing vision was the initial symptom in 68 per cent of the cases. The duration of the visual symptoms before operation seemed to bear a definite relation to both the incidence and the degree of postoperative improvement. Nine of 10 cases with visual symptoms for less than 10 years showed improvement in vision following operation, and in 3 of 8 cases with symptoms for from 2 to 7 years there was local improvement.

Although postoperative improvement of vision is possible in blind eyes, the degree of improvement is proportional to the visual acuity before operation. If pre-operative vision is decreased to the perception of hand movements there is little hope of useful postoperative vision, but if pre-operative vision is 20/50 or better the chance of restoration of normal visual acuity is good.

The appearance of any marked degree of contraction in the visual fields seems to be an unfavorable prognostic sign. In the cases reviewed x-ray therapy before operation did not appear to check progressive failure of vision. The effect of postoperative x-ray therapy on vision was not determined definitely because of the lack of a sufficiently large control series of cases not receiving this treatment.

The author concludes that the prognosis as regards postoperative restoration of the visual fields in cases of pituitary adenoma is directly dependent upon the time of surgical interference.

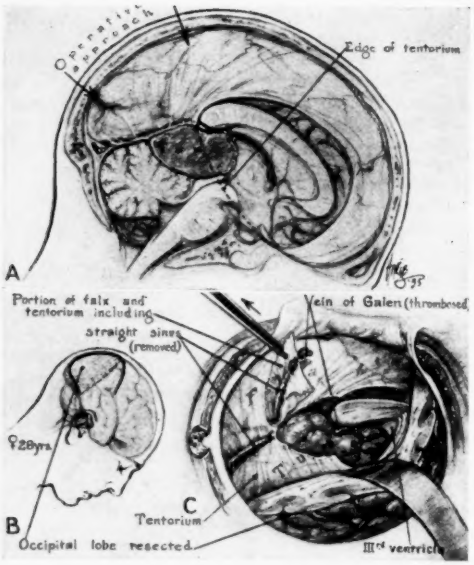
ROBERT ZOLLINGER, M.D.

Dandy, W. E.: Operative Experience in Cases of Pineal Tumor. *Arch. Surg.*, 1936, 33: 19.

The author, who has operated on 10 cases of pineal tumor, reports in detail 3 cases treated surgically with good results.

The symptoms consisted chiefly of signs and symptoms of intracranial pressure due to occlusion of the aqueduct of Sylvius. Occasionally there were localizing signs such as ptosis, which was usually bilateral, limitation of the upward movements of the eyes, and fixation and dilatation of the pupils. In none of the 10 cases were there any endocrine disturbances. The most important objective evidence of the tumor, especially in children, was a roentgen shadow indicating calcification in the pineal region. The final localization and diagnosis depend upon ventriculographic changes, namely, a filling defect in the posterior part of the third ventricle and obliteration of the suprapineal recess. Six of the author's 10 patients were children between 10 and 17 years of age. Dandy's method of exposing and removing a pineal tumor is shown by illustrations and discussed in detail.

The pineal tumor is exposed by an occipital approach, separation of the right cerebral hemisphere from the falx, and splitting of the corpus



Drawings illustrating the method of producing more adequate exposure of a large tumor in the pineal region. When the ventricles are relatively small or the tumor is relatively large, the only possibility of carefully extirpating the growth is excision of the posterior part of the hemisphere to provide room. *A* shows the relative size and position of the tumor, which extended backward under the tentorium and dislocated the cerebellum. *B* indicates the amount of the posterior pole of the brain that was removed for the exposure. *C* shows the method of removing, when necessary, the lower part of the falx, parts of the right and left sides of the tentorium and the straight sinus. The caudal pole of an extensive tumor of this kind cannot be reached without this additional exposure. It will be noted that the straight sinus and the great vein and both small veins of Galen are included in the extirpation.

callosum. Perhaps the most essential part of the operative procedure is evacuation of fluid from the ventricular system. In cases of large tumor in which the ventricles are smaller, resection of the posterior part of the right cerebral hemisphere is necessary.

Transient blindness and subtotal paralysis of all the extra-ocular muscles followed operation in all of the 3 reported cases in which the intervention was successful, but these disturbances disappeared a week or ten days later. ROBERT ZOLLINGER, M.D.

Tumarkin, I. A.: Some Aspects of the Problem of Facial Paralysis. *Proc. Roy. Soc. Med.*, Lond., 1936, 29: 1685.

The various problems concerned in the treatment of facial paralysis are discussed. A study of 25 cured cases and 18 cases in which the treatment failed to cure showed that pain with loss of taste means a 2-to-1 chance that recovery will not result. Absence of pain with no loss of taste means a chance of 25 to 1 in favor of recovery. The author attaches less importance to the presence of only one of these symptoms and believes that in the majority of cases in which recovery fails to occur there is a lesion involving the first portion of the nerve. He bases this conclusion on the fact that 13 of 18 patients who failed to recover had crocodile tears to some degree. He shows the nerve pathways of these lachrymatory impulses by an illustration. He believes that operation delayed months or years after the onset of paralysis cannot be expected to produce much improvement. He states that there is evidence which suggests that reaction of degeneration does not necessarily mean absolute death of the nerve and even in its presence a timely decompression may still produce a dramatic result.

He describes an operation of vascular decompression. He believes that in cases of inflammation the stylomastoid artery may be enormously increased in size with the result that the thin-walled veins and lymphatics in the fallopian canal are obliterated. A vicious circle ensues because blood enters but cannot drain out and therefore causes the nerve to die. He proposes a simple mastoidotomy with extension in 3 directions by removal of: (1) the perifacial cells, (2) the posterior meatal wall until the stylomastoid artery is ablated just as it emerges from the canal, and (3) the outer attic wall, to diminish tympanic congestion. ROBERT ZOLLINGER, M.D.

PERIPHERAL NERVES

Stahl: Injuries of the Brachial Plexus (Verletzungen des Plexus brachialis). *Zentralbl. f. Chir.*, 1936, p. 1541.

After describing the anatomical relationships of the brachial plexus the author discusses in detail the hitherto known double innervation of the arm and the variations which have been determined. He states that the number of bloodless plexus injuries has increased considerably by sports, industrialization, and machine work. A very frequent cause of plexus injury is the motorcycle accident. The cause of the paralysis after such accidents is generally assumed to be a tearing of the plexus.

Of 24 cases of severe plexus injury observed by Kuetter, spontaneous cure resulted in 66⅔ per cent and occurred within fifteen months. Kuettner therefore believes that operation for plexus injury should not be performed before eight months have elapsed.

It has been definitely proved that tearing out of the plexus with its roots may occur. This injury involves either the entire plexus or a portion of it. The first thoracic nerve is the shortest and most tense. The tear extends from there upward, and all of the 5 roots of the plexus may be torn out. The plexus tears just like a tense cable at the point where it is fastened, i.e., near the point of exit from the dura.

In a case of plexus paralysis in which, in addition to the roots of the plexus, the third and fourth cervi-

cal nerves and the accessory spinal nerve were also involved a different mechanism of injury was assumed. Exposure of the plexus showed that it had been crushed upon the transverse processes of the vertebræ. On the basis of 8 cases the author demonstrates by a detailed description of the findings and by sketches made at operation that this mechanism must certainly be quite common. In 3 cases the fifth and sixth nerve roots were crushed upon the underlying transverse processes, and in 1 case the fifth to the eighth cervical roots inclusive were crushed, but the first thoracic root was intact. In the fifth case the fifth to the eighth cervical roots inclusive were crushed upon the underlying transverse processes. The first thoracic root was torn out and lay free in the tissues. At the point in the dural sac where the tearing occurred there was a dural cyst the size of a cherry. In 1 case all of the roots were torn out so that no therapeutic measure was possible. In 2 cases only an extensive scar formation which united the plexus with the deep layer of the cervical fascia was found. In both of these it was possible to free the nerve trunk by neurolysis. In most of the cases of root crushing the other roots were embedded in more or less thick and extensive scar formations. In these cases also neurolysis without the implantation of fat or the hernial sac was done. The crushed roots were freshened with a razor blade and united end-to-end with fine linen thread. This was always possible without creating tension.

Although, according to Kuettner, 66⅔ per cent of severe plexus injuries heal spontaneously, this is not true of injuries from motorcycle accidents as the majority of the latter are not tearing injuries, but caused by an external force directed downward and inward which crushes the plexus upon the transverse processes. In such injuries a long period of waiting is useless. Because of the high incidence of root separations, operation should not be delayed for long, at least not for six months as Kuettner recommends, nor even for three months as Demmer has recommended. All of these plexus paralyses are complete immediately after the accident. However, both motor and sensory involvement retrogress very rapidly and a definite stage of arrest is reached after three weeks at the latest. Therefore in all cases of plexus paralysis in which partial paralysis is still present four weeks after the injury the paralysis was complete at least temporarily. For the paralysis that still remains four weeks after a motorcycle accident, operative measures should be taken.

In the discussion SCHUM reported a case in which plexus injury with shattering of the right scapula and fracture of the first and second ribs near the vertebral articulation was caused by a crushing and severing force.

SCHOEN called attention to the possibility that plexus paralysis may be caused by the use of hard unyielding shoulder supports in operations performed with the patient in the Trendelenburg position. He stated that it may be produced also by overextension of the shoulder.

SAUERBRUCH called attention to the fact that plexus paralysis may occur in individuals with cervical ribs.

In conclusion STAHL stated that in cases of cervical ribs symptoms of irritation are much more common than those of paralysis. Both disappear immediately on removal of the pressure. This is accomplished most simply by resecting the anterior scalenus muscle according to the method of Adson.

(O. STAHL). HARRY A. SALZMANN, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Nathanson, I. T., and Welch, C. E.: Life Expectancy and the Incidence of Malignant Disease. I. Carcinoma of the Breast. *Am. J. Cancer*, 1936, 28: 40.

The method employed by the authors for calculating the life expectancy of patients with cancer of the breast is based on the theory that the behavior of the living will be similar to that of the dead. It is assumed, for example, that if 10 per cent of all persons known to have died of a certain type of cancer died between 4 and 5 years after the onset of the condition, 10 per cent of all patients with that type of cancer who are still living at the beginning of the fourth year will be dead at the end of that year.

The results of a study of the life expectancy of 1,565 persons with carcinoma of the breast who were observed at the Collis P. Huntington Memorial Hospital, Boston, and the Pondville State Hospital of Massachusetts are reported in detail with the aid of graphs and tables.

Of 100 persons with untreated cancer of the breast (97 women and 3 men), 25 per cent died within the first year, an additional 25 per cent were dead at the end of 2¼ years, and 25 per cent survived more than 4 years. The median age at the time of onset of the condition in this group was 58 years. The median age of patients with cancer of the breast who were treated was 52 years. The data show that cancer of the breast runs a more rapid course in the young than in the old.

Of the treated patients, 25 per cent died within 2 years, 50 per cent within 3½ years, and 75 per cent within 6½ years after the onset of the disease. Two years after the onset there were 25 per cent more patients alive in the treated than in the untreated group; after 5 years, 85 per cent more; and after 10 years, 175 per cent more.

The normal life expectancy is about 6 times the life expectancy of women of the same age with treated carcinoma of the breast.

Of the reviewed cases, only 24 (1.1 per cent) were cases of cancer in the male breast. It appears that the disease is less malignant in the male than in the female.

The life expectancy with respect to age is poorer below the fortieth year of age. After the age of 60 years it is better, but in the late years it becomes slightly poorer because of the decrease in the normal life expectancy at advanced age.

In the entire group of cases reviewed the incidence was highest between the ages of 46 and 48 years. In about one-third of the cases the condition appears before the age of 45 years; in another third, between the ages of 45 and 55 years; and in the remainder, after the fifty-fifth year. It is stressed that this is the age incidence in patients seen in hospitals.

J. DANIEL WILLEMS, M.D.

Bérard, L., and Dargent, M.: Therapeutic Methods and Limitations in Cancer of the Breast (Méthodes et limites thérapeutiques dans les cancers du sein). *Lyon chir.*, 1936, 33: 513.

From a study of the results of the treatment of cancer of the breast the authors conclude that in operable cases Halsted's operation is the only justifiable procedure. In inoperable cases physical agents may be used and may render operation possible later. Unfortunately even Halsted's operation does not prevent recurrences and metastases. Therefore patients subjected to it should be kept under observation.

The authors believe that prophylactic roentgen therapy is useless if not dangerous. While irradiation gives good results in the treatment of local recurrences and metastases, it should be employed for the treatment of recurrences and metastases rather than in attempts to prevent them. When used for prevention it may cause a radio-immunization which will render later treatment ineffective.

Another method of therapy that must now be taken into consideration is biochemical treatment. Arloing, Morel, and Josserand have been studying the action of ascorbic acid and its organometallic compounds for 5 years. While it is still too early to judge their results, injections of these substances seem to have an appreciable effect on recurrences and metastases of cancer of the breast.

The authors report the case of a young woman who had a large encephaloid tumor just to the right of the right breast. Examination revealed extensive invasion of the skin and diffuse cancerous lymphangitis of the pectoral, axillary, and scapular regions. The diagnosis of encephaloid glandular epithelioma was confirmed by biopsies. On biochemical treatment, the lymphangitis receded, the skin became soft, and, after marked congestion, the tumor gradually decreased in size, softened, and finally became gangrenous in the center. Surgical operation was then performed. It consisted of simple removal of the gangrenous tissue. Postoperatively, the improvement continued and ultimately complete cicatrization took place. Immediately after the operation the injections of ascorbic products were discontinued. Two months later a nodule appeared on the surface of the left breast and on extirpation was found to be an epithelioma of the same type as that on the right breast. The authors believe that this metastasis was present at the time the intravenous treatment was stopped. On its discovery the injections were immediately begun again. However, other metastases appeared and necessitated a

Halsted operation. Since the operation another metastasis has been found in the upper juxta-epithyseal region of the left humerus.

In certain cases of inoperable cancer the authors have found that ascorbic acid treatment is followed by stabilization of visceral metastases, improvement in the general condition, and restoration of the appetite and strength. In a case in which the condition was developing with special rapidity it resulted in the disappearance of an infiltration in the axilla which extended to the clavicle. The patient was operated upon in April, 1935, but developed a recurrence in September of the same year. The general condition was serious. A series of injections begun in January, 1936, brought about such a retrogression of the infiltration in the deltoscapular region that, in March, a radical operation was possible. The early results of the operation are very satisfactory.

In conclusion the authors state that while certain cancers of the breast react favorably to biochemical treatment, a great deal remains to be learned about the indications and contra-indications of such therapy. It is probable that biochemical treatment has some of the advantages and disadvantages of radiotherapy which depend on the histological form of the tumor, its degree of development, and factors still unknown. AUDREY GOSS MORGAN, M.D.

TRACHEA, LUNGS, AND PLEURA

Kourilsky, R., and Anglade, P. H.: A Clinical and Experimental Study of Atelectasis (L'atélectasie pulmonaire et expérimentale). *Arch. méd-chir. de l'appar. réspir.*, 1936, 11: 251.

The authors report experiments carried out on dogs to study the clinical and roentgen findings in atelectasis. The technique of the experiments is described and the findings are shown by roentgenograms and photomicrographs. The bronchus was at first occluded with laminaria tents, but as this method always caused infection the occlusion was later effected by ligation.

It was found that occlusion of the bronchus causes mechanical respiratory disturbances before it causes atelectasis. The diaphragm rises on the occluded side and the heart and mediastinum deviate in that direction. The pleural pressure becomes negative. Clinical demonstration of these signs indicates atelectasis of a lobe. A period of at least ten hours elapses before roentgen signs appear.

For the appearance of roentgen signs the collapsed region must be of considerable size. In some of the experiments bronchi after the secondary division were ligated so that collapse of only a small territory was produced. In these there was no roentgen picture in spite of the slight hemorrhage caused by the operation. This finding is of clinical importance for it shows that the roentgen pictures ordinarily considered those of atelectasis are pictures, not of the atelectasis, but of the accompanying inflammation.

The animals operated on in the manner described lived for months. Some of them have been under observation for as long as a year. In some cases the ligature was absorbed and the lobe became permeable again. If the ligature is firm, the atelectasis may persist indefinitely and in itself does not cause cicatricial sclerosis. It does not cause sclerosis unless it is infected.

Dilatation of the capillaries occurs in the early stages of atelectasis even if it is aseptic. This is probably due to the slowing of the circulation and the capillary congestion caused by the collapse of the lung.

Of various procedures employed to determine the nervous mechanism of atelectasis, such as stimulation of the pneumogastric, section of the pneumogastric, stimulation of the left superior cervical ganglion of the sympathetic, and denervation of the left bronchus, none caused atelectasis.

AUDREY GOSS MORGAN, M.D.

Durand, H.: Atelectasis. An Anatomicopathological Study (L'atélectasie pulmonaire. Étude anatomopathologique). *Arch. méd.-chir. de l'appar. réspir.*, 1936, 11: 277.

The author claims that in recent years the term "atelectasis" has been applied to conditions that are not true atelectasis. This has been due to too free interpretation of roentgen pictures. While the roentgen findings are of great aid in the diagnosis of atelectasis they must be checked by the findings of anatomopathological examination.

Durand defines atelectasis as a condition of the fetal lung in which the alveoli are collapsed and devoid of air but capable of being filled and regaining their normal caliber. The lungs are reduced in size and generally red like the liver or of the color of the spleen. They are engorged with blood and sink in water. The alveoli are lined with a single layer of rounded or cubical cells.

In many of the cases described as cases of atelectasis the collapse of the lung is merely secondary to some disease of the lung and of only slight importance. The condition of primary interest is bronchopneumonia, pleuropneumonia, pleurisy, or cancer. In recent years Americans have paid a great deal of attention to a group of cases of so-called atelectasis caused by occlusion of a bronchus occurring, for instance, in surgical operations, particularly operations for adenoids. A fragment of tissue dropped or inhaled into a bronchus may produce the clinical and roentgen picture of atelectasis, but removal of the foreign body is followed by recovery. Acute atelectasis may result also from severe hemoptysis. This condition is accompanied by the retraction of the lung, the rise of the diaphragm, and the displacement of the heart and mediastinum which are seen in the infant with atelectasis. The author reports 3 cases which came to autopsy.

The conditions in these cases were not nearly so simple as in true atelectasis. The alveoli were empty of air but filled with blood. In the first case

there were microscopic tubercles in the first stages of the formation. The collapse caused by the flooding with blood was evidently not a simple mechanical obstruction but dependent upon nervous factors which caused the alveoli to contract on their hemorrhagic content, the size of the lung being therefore decreased instead of increased. In the 2 other cases the lung was not collapsed or retracted although the roentgen picture was that of atelectasis.

The author states that mere absence of air does not mean atelectasis. In chronic atelectasis dense sclerosis of the tissue takes place after a time and the alveoli become incapable of distention. The condition is then not atelectasis in the true sense of the word, but a cicatricial sclerosis.

AUDREY GOSS MORGAN, M.D.

Racine, Patte, Gallot, Turiaf, and Brincourt: Clinical Forms of Atelectasis (Formes cliniques de l'atélectasie pulmonaire). *Arch. méd.-chir. de l'appar. respir.*, 1936, 11: 299.

The easily diagnosed sudden massive atelectasis affecting a previously normal parenchyma is usually due to bronchial obstruction and disappears when the obstruction is removed. Transitory lobular atelectases and such as are surrounded by foci of inflammation or sclerosis cannot be demonstrated clinically. Topographically, atelectasis includes the total form, lobular forms, and the scattered forms such as perilesional and transient forms.

Non-tuberculous acute atelectases may be the result of an intrabronchial foreign body or occur as a postoperative complication. The usually opaque foreign body can be demonstrated roentgenologically. The postoperative form may follow any type of operation, but is most common after laparotomies, whether general or local anesthesia is used. Non-tuberculous acute atelectasis is conditioned by 3 factors: (1) bronchial obstruction, (2) gas resorption and, according to Henderson, (3) loss of thoracic muscular tonus. In the authors' opinion, the last factor plays a very secondary rôle.

The acute transitory atelectases of pulmonary tuberculosis may be divided into 3 chief groups: (1) posthemoptoic atelectases, (2) those due to the transbronchial migration of caseous fragments or glandular foci, and (3) those of questionable origin.

Chronic atelectases include those associated with tumor, especially cancer, and those complicating tuberculosis, whether of the pure or associated type or complicating therapeutic pneumothorax.

In chronic atelectasis with cancer there is hemithoracic retraction with respiratory dullness. The diseased hemithorax is almost immovable whereas on the normal side mobility is unimpaired. The intercostal spaces are constricted and depressed. If the lesion is to the right, the heart beats are perceived to the right of the sternum, whereas if the lesion is to the left, the heart beats are perceptible farther off in the left axilla in contrast to the findings in pleural effusion. Vesicular murmur is absent and often replaced by a tubal whisper due to sound transmission by condensed lung tissue. Dullness of the hemithorax is both anterior and posterior.

In the massive type, roentgen examination confirms the clinical findings and reveals the extent of the process as well as the characteristic signs of atelectasis. The involved side shows homogeneous and complete opacity. The diaphragm on that side is elevated, but its arc is of a regular rounded shape. The heart and trachea are displaced, but the trachea retains its linear contour without the tortuosity seen in retractile sclerosis. Fluoroscopic examination shows a pendular movement of the mediastinum with inspiratory attraction toward the involved side. The intrapleural pressure is markedly decreased. Manometric signs are of diagnostic value as the roentgen picture may be simulated by any process of pneumonic densification or sclerosis. Fibrothorax is the most frequent cause of diagnostic error. If the atelectasis is complicated by sclerosis and pleural symphysis, determination of the intrapleural pressure may become impossible.

Atelectasis is most frequently lobar and due to obstruction of a lobar bronchus. Except for their limited extent, the clinical and roentgen signs are like those in massive atelectasis. Respiratory obscurity and hemithoracic retraction are more marked on the left than on the right side. In total atelectasis, expiratory and inspiratory pressure are about parallel, but in lobar atelectasis only the inspiratory pressure is markedly diminished. Certain unilobar opacities may be associated with splenopneumonia. If combined with mediastinal and diaphragmatic attraction, with rapid and complete retrogression, the indications are in favor of lobar atelectasis.

Circumscribed forms of lobular atelectasis in the vicinity of various pulmonary lesions have been demonstrated histologically but not so clear roentgenologically. Perilesional atelectases have been held responsible for transitory shadows in the vicinity of such lesions without clinical manifestations. In pericavitary atelectasis the opacity usually disappears suddenly upon the very first insufflation of pneumothorax. Transitory shadows in healthy or tuberculous lungs may possibly be due to inflammatory bronchiolar obliteration.

The acute transitory atelectases of pulmonary tuberculosis are usually massive, less frequently lobar. The posthemoptoic type is most common in young persons with progressive, localized ulcerocaseous tuberculosis and usually follows severe hemoptysis. In many of the cases reported as posthemoptoic splenopneumonia the condition was probably atelectasis due to obstruction by a clot or bronchial spasm. Acute tuberculous atelectases of doubtful origin may be due to a tuberculous vegetative or stenotic bronchitis or to obstruction of the smaller bronchi by tuberculous bronchitis.

Intrabronchial cancer causes bronchial obstruction and a pure atelectasis. Juxtabronchial cancer compresses and flattens the bronchus causing incurable atelectasis. Primary cancer of the mediastinal lymph glands causes simple atelectasis. In

cases of metastatic cancer or reaction of the glands to distant cancer, the diagnosis is difficult. Other conditions giving rise to atelectasis are Hodgkin's disease, mediastinal cysts, lymphogranulomatosis, the glandular tumors of lymphatic leukemia, angioma, and syphilitic and tuberculous mediastinitis. If the compression involves a stem bronchus, atelectasis is total, whereas if it involves an eparterial or hyparterial bronchus, the atelectasis is lobar. The mechanism by bronchial obstruction is very simple; sympathetic, parasympathetic, and phrenic factors are merely accessory.

The authors report illustrative cases of chronic atelectasis due to intrinsic bronchial stenosis, extrinsic isolated bronchial stenosis, and secondary extrinsic bronchial stenosis or stenosis associated with anterior pulmonary lesions. Cancer as the cause may be determined by elimination of other causes of bronchial stenosis, the demonstration of the neoplastic triad of age, anemia; and cachexia, and the discovery of a superficial adenopathy by biopsy. Atelectasis due to hilar cancer may retrogress if ulceration relieves the compression, but even under these conditions is usually fatal.

In atelectasis associated with diffuse cancer of the lung the diagnosis is most difficult. Bronchoscopy and roentgenography following the injection of lipiodol are of great value. In intrabronchial cancer with early atelectasis, lobectomy or pneumectomy may be justifiable. Cancer causing extrinsic compression is beyond therapeutic aid.

In chronic tuberculosis, atelectasis involving the healthy parenchyma is diffuse or lobar. When it coexists with tuberculous sclerosis or pachypleurisy it is known as "associated atelectasis." The diffuse type occurs as a rule in patients with chronic cavitation of the left apex. As there are no functional symptoms the diagnosis must be based on the roentgen demonstration of progressive obscuration of the lung. This chronic type may progress to sclerosis or be complicated by bronchial dilatation persisting after cure of the tuberculous process. It is believed by some that atelectasis is a limited process, but according to the theory most generally accepted it has an exacerbating effect, the negative intrapleural pressure favoring extension of the lesions. Bronchiolar obstruction seems to play the chief rôle in the causation of atelectasis of the healthy pulmonary parenchyma. Such obstruction may be due to ordinary inflammation or to reflex sympathetic disturbances. Paralysis of the diaphragm is also a factor to be considered.

Besides the diffuse massive atelectases there are also chronic lobar atelectases which, in contrast to the former, are more common on the right side. They are more often due to obstruction of the lobar bronchi than to diffuse bronchiolar obstruction. Atelectasis associated with sclerosis or pachypleurisy plays a part in many thoracic constrictions. In therapeutic pneumothorax massive atelectasis of the collapsed lobe is considered a favorable sign.

EDITH SCHANCHE MOORE.

Mamou, H., Patte A., and Gallot, H. M.: Treatment of Atelectasis (Traitement de l'atélectasie pulmonaire). *Arch. med.-chir. de l'appar. respir.*, 1936 11: 331.

The treatment of pulmonary atelectasis due to an intrabronchial foreign body is dependent upon whether the foreign body is fluid or solid. If it is fluid, as in posthemoptic atelectasis, expectant treatment is justifiable as spontaneous ejection of the foreign body and retrogression of the atelectasis may be expected. In some cases ipecac may aid in the expulsion of the foreign body. A very small insufflation of oxygen after determination of the endopleural pressure may aid in the diagnosis and have a curative effect on the atelectasis. Bronchoscopy is contra-indicated in the presence of hemorrhage. Atelectasis may be caused by mucus plugs as well as by blood clots.

If the foreign body is solid, expectant treatment is not justifiable as spontaneous ejection occurs in only a very small percentage of cases. The foreign body should be removed following bronchoscopy. However, the latter should not be attempted before the reaction to initial attempts at removal have subsided. If the first attempt at bronchoscopy fails, from 6 to 8 days should intervene before another is made. In 98 per cent of cases complete cure follows extraction of the foreign body.

Postoperative atelectasis is often the result of mucus obstructions due to anesthesia. Bronchoscopy with aspiration of the foreign matter is indicated. If this is done promptly the results are good. Recently Henderson has suggested carbon anhydride inhalations to stimulate the tonus of the respiratory musculature as he attributes postoperative atelectasis to a decrease of diaphragmatic and general tonus due to general anesthesia. The inhalations are begun immediately after operation to prevent atelectasis. They are given through an open mask and continued just long enough to produce a marked hyperpnea and then repeated after an interval of 5 minutes. Thereafter 2 inhalations are given every 3 or 4 hours.

Other preventive measures include careful supervision and training of children to prevent the aspiration of foreign bodies and care to remove dentures before the induction of anesthesia for operations.

In chronic tuberculous atelectasis the treatment should be directed to the causal lesion. The treatment of choice is artificial pneumothorax. Phrenicectomy is dangerous as it may itself cause atelectasis. In some cases thoracoplasty has given good results with progressive evolution to simple sclerosis. Bronchoscopy has also been attempted, but the author has not used it for this condition.

In atelectasis due to tumor of the mediastinum, radiotherapy has given splendid results, especially in Hodgkin's disease. In cases of endobronchial tumor the ideal treatment is pneumectomy, but American surgeons seem to believe that endobronchial electrocoagulation of the tumor is associated with less risk and is therefore preferable.

In atelectasis associated with various pulmonary lesions the treatment should be directed to the causal disease. In syphilis, atelectasis has been favorably affected by antispecific hydrargobismuth therapy. EDITH SCHANCHE MOORE.

Monaldi, V.: A Résumé of Three Years of Study of the Cure of Pulmonary Tuberculosis by Anterolateral Thoracoplasty (Résumé de trois ans d'études sur la cure de la tuberculose pulmonaire par la thoracoplastie antérolatérale). *Arch. méd-chir. de l'appar. respir.*, 1936, 11: 174.

The practice of thoracoplasty in pulmonary tuberculosis is based upon the doctrine of respiratory trauma (Forlanini). Monaldi first discusses the manner in which the mechanical factors of respiration affect the different portions of the lungs.

The forces acting on the lung resolve themselves into 4 components, 2 vertical (an inferior and a superior, regulated respectively by the diaphragm and the first rib) and 2 lateral (dependent upon the movements of the ribs). It is to the second 2 components that anterolateral thoracoplasty is directed. Phrenicotomy may be added to overcome the inferior vertical component.

The thoracoplasty is performed in 2 stages. In the first stage the fourth to the seventh ribs are resected subperiosteally, 9 cm. being removed from the fourth rib and 4 cm. from the seventh. In the second stage, performed about 10 days later, 10 cm. are resected from the second and third ribs, the first rib is removed entirely, and the phrenic nerve is sectioned or crushed.

The extent of the operation is determined by the location of the lesions. Lesions in the upper lines of movement are treated by resection of the first, second, and third ribs combined with crushing of the phrenic nerve, and lesions lower in the chest by resection of the fourth to seventh ribs and phrenicectomy.

In a follow-up of 200 patients subjected to this operation it was found that from 60 to 70 per cent of them were cured. In general the exterior form of the thorax was well preserved. There was a certain limitation of the vital capacity, but this tended to disappear with time. The cardiac function was scarcely at all modified.

The indications for total thoracoplasty include exudative and ulcerative tuberculosis, cavitation, extensive fibrosis with small cavities, and tuberculous empyema.

The article is illustrated with 3 diagrammatic sketches and 4 roentgenograms.

ALBERT F. DE GROAT, M.D.

HEART AND PERICARDIUM

Churchill, E. D.: Pericardial Resection in Chronic Constrictive Pericarditis. *Ann. Surg.*, 1936, 104: 516.

The author states that chronic constrictive pericarditis is a rare disease but is often not diagnosed. Its cure by operation is one of the most important accomplishments of surgery of the heart. He believes that while rheumatic infection not infrequently causes obliteration of the pericardial cavity, the evidence that the adhesions so produced may cause the syndrome of constrictive pericarditis is slight. Active tuberculosis of the pericardium may produce the entire syndrome of chronic constrictive pericarditis, but the results of operations on the heart during this phase of the disease are uniformly discouraging.

For pericardial resection in chronic constrictive pericarditis Churchill prefers general anesthesia induced in a manner to permit differential pressure if this should be necessary. He uses ether administered intratracheally. The patient is placed in a dental chair and kept in a semirecumbent position to diminish the venous return to the heart. An ample chest wall window is usually obtained by resection of the third, fourth, and fifth costal cartilages with about 1 in. of the corresponding ribs. Sometimes the sixth cartilage and rib end are also resected. After ligation of the internal mammary vessels the margin of the sternum is exposed and a liberal resection of the left half is done. The left pleural reflection is then mobilized and separated from the pericardium. At times this is so adherent that opening into the pleural cavity cannot be avoided.

After exposure of the parietal pericardium by dissection and retraction of the overlying structures, the pericardium is incised in the thinnest area that overlies the left ventricle. A cleavage plane is established between the myocardium and the scar. It is essential to select a plane of cleavage that lies close to the heart muscle itself. Grasping the edge of the scar and exerting traction during the subsequent dissection facilitates the exposure in the more inaccessible areas. If the scar extends laterally over the left ventricle this region is removed first. The excision may be carried as far as the phrenic nerve, but that structure is never sacrificed.

As densely adherent scar is often present in the sulcus formed by the descending branch of the left coronary artery, this region is approached cautiously to avoid injuring the vessel. Frequently it is easier to approach this vessel from 2 sides. A second very adherent region is the right auriculoventricular groove, in intimate association with the diaphragmatic pericardium. It is important to free this region if possible.

Because of the thin walls of the auricles actua decortication of these chambers is too hazardous a procedure to attempt. Persistent bleeding from the pericardium is controlled by fine silk sutures.

Although the chambers of the heart are rarely entered, such accidents are possible. Therefore, as a safeguard, a generous flap of pericardium is left attached to the point of dissection. If the chamber is entered accidentally the flap is then available for repair of the defect. However, when there is a rigid calcified scar this procedure may be impossible.

When an area of encapsulated fluid is present it is important to resect the wall of the cavity. Removal of the parietal pericardium over such an area will not have the desired effect.

The incision is closed by replacing the skin and muscle flaps without the use of drains. The danger of tamponade of the heart from the accumulation of serum does not seem to be very great. After the operation an oxygen tent is used routinely. Blood transfusions are not given as the author believes they may cause cardiac dilatation.

Churchill reports 10 cases in which the described operation was performed. Six of the patients were cured, 3 were benefited, and 1 died. By "cured" is meant restoration of the ability to resume normal functional activity. In the cases of boys this means the ability to participate in athletics such as football. In 2 cases in which the author operated for active tuberculous pericarditis the mortality was 100 per cent.

EARL O. LATIMER, M.D.

ESOPHAGUS AND MEDIASTINUM

McGibbon, J. E. G.: The Clinical Manifestations of the Spread of Carcinoma of the Esophagus Observed During Life. *Brit. J. Surg.*, 1936, 24: 86.

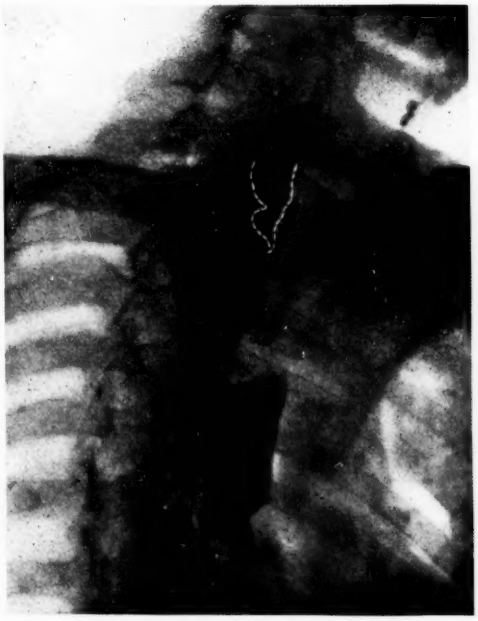
The results of the treatment of esophageal cancer, like those of the treatment of cancer elsewhere in the body, depend upon the time of diagnosis and the virulence of the growth. A review of a large number of reports shows that the time which elapses before the patient comes to the surgeon ranges from six to eight months, and that in a considerable number of cases treatment for such conditions as nervous spasm and dyspepsia is given, sometimes even for months, before the correct diagnosis is made.

While varying in type and behavior, carcinoma of the esophagus is not so frequently of low virulence and long duration as was formerly believed. In a large series of cases the duration of life after the development of the first symptoms varied from four and seven-tenths to ten and five-tenths months. Patients with carcinoma of the esophagus show a more marked reaction to serological tests than those with carcinoma elsewhere.

The author describes 4 modes of spread of carcinoma of the esophagus: (1) direct extension, (2) lymphatic permeation and embolism, (3) extension by way of the blood stream, and (4) implantation.

Of 100 cases of esophageal cancer, the lesion was in the upper third of the esophagus in 17 per cent, in the middle third in 47 per cent, and in the lower third in 36 per cent.

McGibbon describes the lymphatic drainage of the esophagus. The findings of experimental studies indicate that spread of esophageal cancer by way of the lymphatics is at first slow and difficult, but that, when once it has broken through the first layer, invasion is widespread and comparatively rapid.



Roentgenogram showing 2 malignant strictures of the esophagus.

The first symptom of cancer of the esophagus is usually dysphagia. Tumors located in the upper third of the esophagus may involve one or both of the recurrent laryngeal nerves. Hiccup is sometimes caused by involvement of the phrenic nerve with accompanying paralysis of the diaphragm and massive collapse of the lung. Perforation of the tracheobronchial tree is usually characterized by cough, hemoptysis, dyspnea, and terminal pneumonia.

The hope is entertained that through wider recognition of the gravity of abnormalities in the act of swallowing the necessary examinations may be made earlier and the diagnosis established at a time when intervention will be possible. The author emphasizes that the investigation of cases of such abnormalities is not complete without endoscopic examination.

He divides the clinical course of carcinoma of the esophagus into 3 periods: (1) the latent period, (2) the symptom period, and (3) the manifest period.

MILLARD F. ARBUCKLE, M.D

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Uggeri, C.: Congenital Femoral Hernia (Sull'ernia crurale congenita). *Ann. ital. di chir.*, 1936, 15: 371.

Uggeri reports a femoral hernia in a girl eleven years old.

The piriform sac was directed upward and outward and was found adherent to the superficial epigastric vessels. The broad ligament was inserted into it and the ureter lay posterior to it. A small encapsulated lipoma was situated at the fundus. The sac wall was transparent and elastic, without a fatty covering, and on histologic examination was found to consist of an extremely thin membrane of endothelial cells beneath which there was a narrow layer of connective tissue. This structure and the absence of a fatty layer excluded the possibility that the sac was part of the pelvic peritoneum.

The author next presents a critical discussion, with references to reported cases, of the arguments for and against the congenital origin of femoral hernia.

He concludes that, while the great majority of such hernias are acquired, some are certainly congenital. The frequency of those of the congenital type has not been determined, but they are probably numerous. The diagnosis of congenital origin is based on a combination of criteria: the age at which the hernia appeared, the characteristics of the sac (form, transparency, elasticity), the direction of its extension, its contents (ovary, tube, broad ligament), and the presence of a ureterocele. Observations are still too few to show the relative importance of the various signs, whether any of them are pathognomonic, or whether the diagnosis of congenital origin can be made independently of the age of appearance of the hernia and when the sac has undergone secondary changes. In the author's opinion the histologic structure of the sac (which apparently has not been studied previously in congenital femoral hernia) is the most important single characteristic and a sure criterion of its congenital or acquired nature. However, secondary changes in a congenital sac may mask its primitive structure. The retrograde direction of the sac, which is inexplicable by mechanical factors, and the relations of the sac to the vessels are also very significant. The other characteristics, when present singly, are of minor importance.

The origin of the peritoneal diverticulum is obscure. In the case reported by the author it appeared to be related to the vessels. Uggeri expresses the opinion that the presence of a ureter in a hernial sac is not excessively rare, but is often overlooked or not reported.

The article is accompanied by photographs and a bibliography. M. E. Morse, M.D.

Fallis, L. S.: Inguinal Hernia. *Ann. Surg.*, 1936, 104: 403.

The author reviews 1,600 consecutive operations for inguinal hernia performed on 1,247 patients at the Henry Ford Hospital, Detroit, in the period from 1920 to 1929. Only 27 (1.1 per cent) were performed on women. The youngest patient was three weeks old and the oldest eighty-nine years. Both of these had a strangulated hernia. Over 80 per cent of the patients were in the third, fourth, and fifth decades of life, the period of greatest physical activity.

One hundred and fourteen (7.1 per cent) of the operations were performed on obese individuals whose excess fat in the subcutaneous and extraperitoneal tissues made the operation technically more difficult, lengthened the operative time, and increased the risk of infection. Of 66 recurrences, 7 (10.5 per cent) occurred in patients who were overweight.

Thirteen hundred and twenty (82.5 per cent) of the operations were performed on persons engaged in occupations which required heavy lifting. Of the 66 recurrences, 59 (90 per cent) occurred in patients who earned their living by hard physical labor.

Nine hundred and ninety-four (62.1 per cent) of the operations were performed on patients who gave a definite history of injury.

Almost one-half of the operations were performed within six months after the development of the hernia; over 60 per cent, within a year; 20.9 per cent within from one to five years; and 13.7 per cent after more than five years. The time interval between the occurrence of the hernia and the operation had no appreciable bearing on the recurrence rate.

The claim that the wearing of a truss tends to weaken the tissues of the inguinal region by its continuous pressure, thus making repair less satisfactory, was not borne out, for of the 66 patients with recurrences, only 12 (18.2 per cent) had worn a truss.

Twenty-two (1.4 per cent) of the operations were performed for incarcerated hernias. Of this number, intestinal resection was necessary in only 1.

The total number of hernias occurring on the right side exceeded the total number occurring on the left side in the ratio of 6:5. Recurrence was more common on the left side (38 cases) than on the right side (28 cases). Three hundred and fifty-three (28.3 per cent) of the 1,247 patients had bilateral hernias.

Ethylene and ether anesthesia was used in 524 (32.8 per cent) of the operations; ether anesthesia in 475 (29.7 per cent); ethylene anesthesia in 359 (22.4 per cent); spinal anesthesia in 129 (8 per cent); nitrous oxide-ether anesthesia in 77 (4.8 per cent); and local anesthesia in 36 (2.3 per cent). At the

present time, however, spinal anesthesia is used in over 90 per cent of herniotomies because of the perfect relaxation it produces.

Only 15.7 per cent of the hernias were of the direct type. The saddle-bag type was found in 7.9 per cent of the operations. Sliding hernia was found in 3.3 per cent.

A hernial sac of moderate size was found in 1,040 (65 per cent) of the operations, a small hernial sac in 284 (17.7 per cent), and a large hernial sac in 276 (17.3 per cent). Forty-one of those of moderate side, 14 of the small hernias, and 11 of the large hernias recurred.

The sac was closed by twisting in 762 (47.4 per cent) of the operations, with recurrence in 27: by continuous straight suture in 335 (21 per cent), with recurrence in 20; by pursestring suture in 253 (16 per cent), with recurrence in 11; and by transfixation in 197 (12.3 per cent), with recurrence in 6. In 53 (3.3 per cent), the sac was not opened. Of these, 2 recurred. The author states that in considering the merits of these procedures it should be remembered that transfixation is used only for small hernias and that straight suture is employed for large direct hernias. The record of the pursestring suture is excellent, its wide adaptability being taken into account.

The Halsted operation was performed on 1,386 (88.6 per cent) of the total number of hernias. Of the 673 patients subjected to this operation who were traced, 55 (8.3 per cent) showed a recurrence. The Bassini operation was performed in 214 (13.4 per cent) of the cases. Of the 127 patients traced after this procedure, 11 (8.6 per cent) had a recurrence. In indirect hernias the essential step in the operation is high removal of the sac. In cases of direct hernia special attention must be given to repair and re-enforcement of the floor of Hesselbach's triangle. Repair of the transversalis fascia is also of importance. Small hernias in young adults can be cured without transplantation of the cord. In cases of indirect hernia occurring in fat persons and persons past middle age and in those in which the sac is large, transplantation of the cord is essential for success.

In 1,545 (96.6 per cent) of the operations the suture material was silk. In the remainder, chromic catgut was used. Fascial sutures were not employed.

Three hundred and fifty-three (28.3 per cent) of the patients had bilateral operations, and 43 (65 per cent) of the 66 recurrences followed bilateral operations. Thus, while only one-fourth of the patients had bilateral operations, two-thirds of the recurrences occurred in this group.

At the time that 166 (10.4 per cent) of the herniotomies were done other operations were performed in addition. One hundred and five (63.3 per cent) of the other operations were for the correction of conditions existing in the genitalia.

Eighty-three (5.2 per cent) of the total number of operations were complicated by a variety of conditions. The most frequent postoperative complications were pulmonary affections, which occurred in 33 (2.7 per cent) of the patients. This complication was also the most serious, being responsible for the 3 deaths which occurred, a mortality rate of 0.24 per cent. Wound infection occurred in 16 cases; hydrocele in 14; hematoma in 13; testicular atrophy in 4; and phlebitis in 3.

One-half of the recurrences occurred within one year, and one-third of them occurred more than two years after the operation. In cases of indirect hernia the recurrence rate was 7.4 per cent, and in cases of direct hernia 11.6 per cent. The recurrence of a hernia after operation is usually due to a technical error on the part of the surgeon.

CHARLES BARON, M.D.

Shambaugh, P.: Peritonitis as a Factor in the Mortality of Gastro-Intestinal Surgery. *Ann. Surg.*, 1936, 104: 382.

The observation that peritonitis is a frequent cause of death following operations on the gastro-intestinal tract has led to the assumption that contamination of the peritoneal surfaces with intestinal contents during the operative procedure is responsible for the condition. To combat it, peritoneal vaccination to increase the resistance of the peritoneum to contamination and various more or less complicated "aseptic" methods of anastomosis have been proposed. Against the theory that operative soiling is the important cause of fatal peritonitis is the fact that the natural defensive powers of the peritoneum are sufficiently great to withstand a considerable degree of bacterial contamination, provided the bacteria are not extremely virulent and the inoculation is not prolonged.

The author reports an investigation which he carried out in the cases of 91 patients treated at the Peter Bent Brigham Hospital, Boston, to determine the relative importance of peritonitis as a cause of death following operative procedures on various parts of the gastro-intestinal tract. Twenty-three of these patients died of peritonitis.

Of 25 patients coming to autopsy after gastric surgery, 13 were subjected to gastric resection, 9 to gastrojejunostomy, and 3 to gastrojejunostomy and pyloroplasty. One was treated by gastrostomy. Eight of the operations were performed for peptic ulcer and 17 for cancer of the stomach. Eight of the deaths were due to pneumonia, 4 to circulatory failure, 3 to pulmonary abscess, 2 to pulmonary embolus, 4 to obstruction, hemorrhage, duodenal fistula, and septicemia from hypodermoclysis respectively, and 4 (16 per cent) to peritonitis.

Of 14 patients who came to autopsy following surgery on the small bowel, 7 died of pneumonia, 4 of circulatory failure, 1 of parotitis, and 2 (14 per cent) of peritonitis.

Of the patients subjected to surgery of the large bowel, 52 came to autopsy. Of the latter, 48 were operated upon for carcinoma. Death was due to pneumonia in 19 cases, circulatory failure in 9 cases, intestinal obstruction in 4 cases, pelvic cellulitis and

septicemia in 2 cases, pulmonary embolism in 1 case, and peritonitis in 17 cases (33 per cent).

It is of interest that pneumonia, not peritonitis, was the most important cause of death following gastro-intestinal surgery. This was true even in cases of surgery of the large bowel. Hence it is apparent that measures to prevent postoperative pneumonia are of at least as much importance as measures to prevent peritonitis. Such measures should include avoidance of surgery in the presence of infections of the upper respiratory tract; sitting the patient up in bed very early after operation; turning him frequently; getting him out of bed as soon as possible; cardiovascular stimulation when indicated; and, possibly, hyperventilation by means of carbon-dioxide inhalations.

In only 6 of the 23 cases of fatal peritonitis reviewed could the condition be attributed to contamination of the peritoneal surface at operation.

In the prevention of fatal postoperative peritonitis, accurate suturing with careful attention to the blood supply is of greater importance than strict asepsis. Because of the great resistance of the human peritoneum to bacterial contamination, operative soiling of the peritoneum, unless massive, rarely causes fatal peritonitis.

JOHN W. NUZUM, M.D.

GASTRO-INTESTINAL TRACT

Meltzer, H., and Spier, W.: The Problem of the Pre-Operative Treatment of Severe Cases of Pyloric Stenosis (Zur Frage der Operationsvorbehandlung hochgradiger Pylorusstenoses). 60. *Tag. d. deutsch. Ges. f. Chir.*, Berlin, 1936.

That patients with high-grade pyloric stenosis who vomit very frequently are in a state of choride deficiency, sometimes even in danger of developing gastric tetany, and that they require the parenteral administration of sodium chloride, especially before any operative procedure, is well known. However, it is not well known that in such patients an acute life-threatening hypochloremic condition may be brought about simply by the infusion of an ordinary isotonic solution of glucose. Such an observation, which is of practical importance and very interesting from the theoretical standpoint, was made by the authors at the Schmieden Clinic in Frankfort.

The patient was a man thirty-five years old who had suffered from stenosis of the pylorus for three years. He had vomited daily for several weeks and came to the Clinic for operation in a condition of starvation and dehydration. Tetanoid phenomena in the form of fibrillary hyperexcitability were noted, and the Chvostek and Trousseau phenomena were present. As the patient was extremely thirsty and hungry, he was given an intravenous continuous drop infusion of a 5 per cent solution of glucose. After about 1 liter of the solution had been introduced into the vein, the first half more rapidly than the last, he suddenly lost consciousness. The respiration became shallow and the pulse scarcely discernible, and a deep comatose inspiration was taken only occasionally. At first there was extreme motor restlessness, but a death-like immobility quickly supervened. As soon as these phenomena were observed the administration of the glucose solution was stopped and normal sodium chloride solution was given intravenously. After about half an hour the pulse and respiration were improved, and after an hour and a half consciousness returned. After about four hours the patient was again able to speak.

In the authors' opinion the phenomena described may be explained as follows:

The patient was suffering from marked chloride deficiency. The chloride content of the tissues as well as of the blood was reduced to the minimum necessary for life and the balance could be disturbed very easily by the slightest accident. As the result of the intravenous administration of glucose solution the blood was considerably diluted and its concentration of chlorides was decreased. To increase the concentration of chlorides in the blood, chlorides from the tissues were liberated into the blood stream, with the result that the tissue chlorides were decreased below the level necessary to sustain life. It was upon this theory that the administration of normal sodium chloride solution was based.

To prove the correctness of their theory the authors produced an analogous condition and made determinations of the chloride content of the blood in animals. In dogs of middle size chloride deficiency was produced by the formation of a gastric fistula. The test was begun after the chlorides had been diminished by about one-third of the highest value. Five hundred cubic centimeters of isotonic glucose solution were introduced intravenously over a period of about two hours. After the first hour the chloride content of the blood showed a considerable decrease, and after the second hour it had dropped to from 43.5 to 44 per cent of the value at the beginning of the test. At the beginning of the second hour the animals became first restless and then comatose. When the administration of the glucose solution was stopped and physiological salt solution was given instead they soon appeared to be normal again and the chloride value in the blood rose to the level at which it was when the experiment was begun.

The authors believe that by this experiment they proved that the concentration of chlorides in the blood may be lowered appreciably and even to a dangerous degree merely by the infusion of a solution free from chlorides.

In several other cases of pyloric stenosis in which they employed glucose solution with care the results were unexpectedly irregular. The results in 2 of them are shown by curves. They demonstrate that in patients without a marked chloride deficiency the chloride concentration of the blood is not always decreased. This fact probably explains why, even in the presence of chloride deficiency, glucose solution can usually be given with impunity.

The case reported in this article and the authors' experiments on animals show that the danger associated with the infusion of glucose solution in the presence of chloride deficiency may be eliminated by giving sodium chloride solution before, or with, the glucose solution. LEO A. JUHNKE, M.D.

Baum, S. M.: Esophageal-Gastric Carcinoma Successfully Treated by Protracted Fractional X-Ray. Six-Year Survival. *Radiology*, 1936, 27: 58.

After briefly discussing various aspects of carcinoma of the esophagus, such as its incidence, most frequent anatomic location, pathologic classification, diagnosis, and surgical and irradiation treatment, the author reports the case of a patient who was treated in March, 1929, and has now remained well for six years. In this case the carcinoma involved the lower end of the esophagus and the cardiac portion of the stomach and was of the squamous-cell type with hornification. The treatment consisted in the administration of high-voltage x-ray therapy by the protracted fractional method without preliminary gastrostomy. The technical factors were 200 kv., filtration by 2 mm. Cu and 1 mm. Al, 4 ma., a skin-focus distance of 70 cm., and portals 400 sq. cm. Cross-firing was done through upper abdominal and right and left oblique portals. Each portal received about 5,000 r. Forty-two treatments were given over a period of 69 days. The average dose per treatment was 480 r. A radio-epidermitis was produced on each portal.

The good result is attributed by the author to the limited extent and relative radiosensitivity of the growth, the fractionation of the x-ray dose, and the length of the period during which the irradiation was given. T. LEUCUTIA, M.D.

Maingot, R.: The Surgical Treatment of Irremovable Cancer of the Pyloric Segment of the Stomach. *Ann Surg.*, 1936, 104: 161.

Maingot states that in fewer than 30 per cent of his cases of cancer of the pyloric segment of the stomach is radical cure found possible on exploration. When the growth cannot be resected the aim of any operation undertaken is to prevent death from starvation, to prolong life and render the patient more comfortable so far as his digestion is concerned, and to ward off, or at least postpone, such complications as profuse hemorrhage, perforation, or severe toxemia.

Although hitherto the operation recommended for the type of case under discussion was posterior or, preferably, anterior gastrojejunostomy, some operation based on the principle of Devine is now more generally performed for the following reasons:

1. The death rate is no higher than that following the simpler short-circuiting operation. In the author's 13 cases there was no immediate mortality.

2. The length of survival is increased. After gastrojejunostomy the length of survival is usually four or five months longer than after simple exploration. By the procedure advocated, it may be increased by several months or, in exceptional cases, even years.

3. The patient is prevented from dying of obstruction, as the gastro-enteric stoma is very large and at a considerable distance from the primary growth, and the latter is excluded. When gastrojejunostomy is performed the stoma is apt to become occluded by the growth, which spreads into the body of the stomach from the pyloric region, or to become compressed by metastatic nodes in the mesocolon or great omentum.

Moreover, in the performance of gastrojejunostomy there is a tendency to place the opening too high up in the body of the stomach in order to make the anastomosis as far as possible from the involved portion of the stomach. The stoma therefore often functions poorly and gives little relief.

4. The immediate postoperative results are eminently satisfactory. It is at once possible to administer fluid nourishment by mouth in unstinted quantities; the appetite is restored; cachexia disappears; and the general health is greatly improved. The improvement in the general condition is often so marked that in the cases of some patients who survive longer than a year doubt may arise as to the correctness of the diagnosis made at the time of the exploration.

The technique is described in detail. It consists of transection of the body of the stomach, exclusion of the pyloric segment, and end-to-side gastrojejunostomy by the antecolic or retrocolic method. CARL R. STEINKE, M.D.

Erickson, R. J.: Intestinal Tuberculosis. *Rev. Gastroenterol.*, 1936, 3: 238.

Intestinal tuberculosis is the most frequent complication of pulmonary tuberculosis and develops to some degree in the majority of fatal cases of the latter condition. Often it is the factor determining the outcome of tuberculosis of the lungs. Pulmonary tuberculosis frequently reaches an advanced stage without marked pulmonary symptoms, intestinal symptoms dominating the picture.

In past years the attitude toward intestinal tuberculosis was very pessimistic. In general this was true also of the attitude toward pulmonary tuberculosis. We know now that in most early cases recovery will result if proper treatment is given. While the onset of intestinal tuberculosis is very serious and the hope of cure is slight when this condition is associated with advanced tuberculosis of the lungs, the author believes that large numbers of patients with pulmonary tuberculosis pass through a period of intestinal involvement without serious symptoms and without a positive diagnosis.

Secondary intestinal tuberculosis is present in about 75 per cent of cases of pulmonary tuberculosis. Erickson found bowel lesions in 71 of 107 cases. He believes that intestinal involvement would be discovered much more frequently if extensive microscopic examinations were made.

The earliest visible lesions of intestinal tuberculosis occur in the lymphoid follicles of Peyer's patches. These nodules finally caseate and break through the mucosa. Necrosis takes place around the edges of the patches and the bacilli are carried by the lymphatics to adjacent areas. In the terminal ileum the ulcers are apt to follow the outlines of Peyer's patches and assume a longitudinal oval outine transverse to the lumen of the bowel. Perforation into the free abdominal cavity is relatively rare, occurring in only about 3 per cent of cases. The perforation is often sealed off by fibrinous exudate.

Tuberculous processes are of 2 types: the exudative, in which the tissues are markedly allergic to the product of infection and respond with an acute inflammatory and destructive reaction, and the proliferative, in which the body is less sensitive and responds with marked evidence of fibrosis and reparative processes.

The most common symptoms of intestinal tuberculosis are pain and diarrhea. However, they are usually too variable to be of great aid in the diagnosis. The most common site of ulcerations is the terminal portion of the ileum. When the lesion is limited to the small intestine, the most common symptom is pain. In cases of combined and more extensive lesions, diarrhea is more frequent and the symptoms are increased in severity and number.

X-ray examination, which will reveal local spasm, hypermotility, or a filling defect in the cecum, constitutes the best diagnostic method today. For lesions above this area in the small bowel no accurate diagnostic method is yet available.

Tuberculosis of the intestine is curable, but its prognosis depends largely on the condition of the pulmonary lesions. Ultraviolet light and a diet high in Vitamins C and D are of great value in the relief of symptoms and cure of the disease. Every effort must be made to prevent the swallowing of bacilli-laden sputum and to render the sputum negative as soon as possible. JOHN W. NUZUM, M.D.

Comessatti, G.: Roentgenological Observations on Intestinal Tuberculosis (Osservazioni radiologiche sulla tubercolosi dell'intestino). *Radiol. med.*, 1936, 23: 577.

Comessatti presents a critical review of present-day roentgenological knowledge of intestinal tuberculosis and reports his observations in 35 cases. In the majority of his cases the intestinal tuberculosis was a complication of pulmonary tuberculosis, and in all of them the lesions were advanced.

Comessatti's findings confirm those of other investigators as to the law of parallelism between the clinical and pathological type of the pulmonary and associated intestinal tuberculosis; the comparative frequency of localization of tuberculosis in the various segments of the bowel; and the high mortality in cases of intestinal tuberculosis complicating pulmonary tuberculosis. In his roentgenological studies a common finding in the diffuse ulcerative form of intestinal tuberculosis accompanying advanced pulmonary lesions was paretic dilatation of single isolated loops of the small intestine, usually the ileum, for a considerable period of time. This was invariably accompanied by ulceration of the cecum. In some of the cases with advanced pulmonary tuberculosis loops of the jejunum showed dilatation due to stenosis lower down. In cases with ulcers of the small intestine the passage of the opaque meal was usually delayed, whereas in those of tuberculosis of the ascending colon the passage of the meal through the colon was hastened. The total time of transit was either normal or increased Pseudostasis in the ileum and Fleischner's paradoxical cecal residuum were often observed. In all cases in which the lesions were diffuse and the small intestine was involved the patient was cachectic.

In 1 case the stenotic syndrome disappeared spontaneously under prolonged medical treatment and actinotherapy. In the case of a patient with tubular stenosis of the ascending colon and the proximal part of the transverse colon, ileotransversostomy gave good results.

Roentgen findings suggesting intestinal tuberculosis are localization of lesions in the ileocecal region with involvement of the last loop of ileum and signs of irritation of the colon, and absence of a sharp differentiation between the affected parts of the intestine and the adjacent tissues. However, in secondary tuberculosis of the intestines the decisive factor in the diagnosis is the presence of tuberculosis elsewhere in the body, and in primary tuberculosis of the intestines, the discovery of tubercle bacilli in the feces.

Roentgen examinations for intestinal tuberculosis should include a study of the functional disturbances and exploration for signs of involvement of the peritoneum and mesentery. Of the greatest importance is the early diagnosis of minimal direct signs of lesions of the small intestine and colon. As these are difficult to recognize, the roentgen findings as a whole, including the indirect and functional signs, must be analyzed.

If non-stenosing intestinal tuberculosis is diagnosed early and subjected to medical treatment, including actinotherapy and a diet rich in vitamins, the outlook is encouraging. However, the first element in success is arrest of the pulmonary focus. Reciprocally, early treatment of the intestinal complications will greatly improve the pulmonary condition. In every case of pulmonary tuberculosis, except perhaps the very early and favorable cases, the examination should include a systematic roentgen exploration of the intestinal tract.

M. E. MORSE, M.D.

Grégoire, R.: Infarction of the Intestine Caused by Anaphylactic Shock (Infarctus de l'intestin par choc d'intolérance). *J. de chir.*, 1936, 48: 305.

Infarction of the intestine due to occlusion of the vessels must be distinguished from forms without a vascular lesion. There are reports of a number of cases of supposed thrombosis of the mesenteric

vessels too extensive for resection in which rapid and complete recovery followed exploratory operation. Such cases cannot be explained on the basis of vascular thrombosis. Several explanations have been suggested. The author rejects the mechanical and infectious theories as he believes the condition is due to a variety of anaphylactic shock. He cites a case in which Couvelaire found a loop of bowel apparently gangrenous due to supposed mesenteric thrombosis. During the operation, adrenalin was injected hypodermically. Thereupon the circulation in the affected loop quickly returned to normal and the general condition improved. The patient rapidly recovered. Grégoire suggests that the entire picture of such a case can be explained as an anaphylactic reaction.

He has tried to reproduce the condition experimentally. In experiments on dogs which were sensitized to horse serum the abdomen opened under local anesthesia and injections of the serum were made into the mesenteric vessels, the wall of the intestine, and the superior mesenteric artery. Intense spasm of the vessel or of the local area of bowel but no gangrene resulted. However, when repeated injections of the horse serum were made in the same loop of intestine at suitable intervals, the Arthus phenomenon was produced, the animal apparently went into shock, the mesenteric vessel supplying the injected loop ceased pulsating, the veins became distended with black blood, and the intestine became blue black and apparently gangrenous. The author gives the protocols of 7 experiments. Further evidence in support of his theory is the fact that agents which tend to relieve anaphylactic shock are apparently efficacious in the condition under consideration—especially adrenalin given hypodermically and general anesthesia. He cites a case in which Lafargue exteriorized an apparently gangrenous loop of bowel and saw it change in color and return to normal after the hypodermic injection of adrenalin.

In his discussion of the mechanism of shock in the production of intestinal infarction the author's remarks are mostly general and do not explain how the condition occurs suddenly in an otherwise apparently normal individual. He states that the diagnosis may be impossible without laparotomy. Operation should be done to exclude other disease, but it should be borne in mind that general anesthesia alone may be of value in the treatment. When infarction of the intestine is found, anti-shock treatment should be instituted. If the circulation in the affected loop improves, the loop can be safely replaced in the abdomen and the abdomen closed.

MAX M. ZINNINGER, M.D.

Somervell, F. H., and Orr, I. M.: Some Contributions to the Causation, Pathology, and Treatment of Duodenal Ulcer and Its Complications. *Brit. J. Surg.*, 1936, 24: 227.

Peptic ulcer is approximately 600 times more common in Southern than in Northern India, but in the State of Travancore, which comprises the southern 200 miles of the west coast of South India, its distribution is not uniform. In the extreme south of the State it is comparatively rare. On the east coast it is less common than in the inlands, and in the north, especially in the central half of the country, it is very prevalent. The fact that its incidence is lowest in the part of Travancore which has the densest population (the southern one-third) seems to indicate a dietetic cause, as does its high frequency in the parts of India where tapioca is eaten.

It is of interest that the inhabitants of the Unnevell district of South India, who used to be almost free from duodenal ulcer, have recently adopted the habit of eating tapioca root and are now developing the lesion with increasing frequency. The great majority of those with ulcer live on tapioca and rice, an almost exclusively carbohydrate diet with a low vitamin content. Meat and fish are rarely taken. Cream, eggs, and most fruits are luxuries used only by the well-to-do, who are not typically the class with peptic ulcer. Vitamins A, B, and C are especially deficient in the diet of the Travancore poor man. In persons living on this diet the incidence of duodenal ulcer is 600 times greater than in the northern Punjab, where the people are said to have one of the best balanced diets in the world. In Travancore itself, peptic ulcer is much more common in the central part of the State, where tapioca and rice constitute the staple diet, than in the southern portion, where a larger variety of vegetables with rice and little or no tapioca is eaten.

In the barracks of the State troops of Travancore, where the diet is well controlled, duodenal ulcer almost never occurs, yet the men come from villages where approximately 1 per cent of the population develop the lesion.

On the seacoast, peptic ulcer occurs only in the coolies working in the fields in the inlands. In the fisher folk who live by the sea and eat fresh fish it is very uncommon.

These facts suggest that the high incidence of duodenal ulcer in Travancore is probably due to Vitamin-A deficiency. In 1927 McCarrison reported that, of rats fed the Madrassi diet for six hundred and seventy-five days, 11.1 per cent developed gastric ulcer, and of rats fed the Travancore diet (tapioca, rice, chilies, pepper, and small amount of fish) for the same length of time, 27.7 per cent developed gastric ulcer and 11.1 per cent a severe duodenitis, whereas well-fed control rats did not develop ulcer. The findings are in agreement with the authors' clinical observation that gastric ulcer is relatively far more uncommon in the Madras district than in Travancore, where duodenal ulcers outnumber gastric ulcers by 33 to 1.

The duodenal ulcers occurring in Southwestern India show several atypical characteristics although the incidence of gastrojejunal ulceration after gastroenterostomy is exactly the same there as elsewhere. The most striking feature is the rarity of perforation. Of a series of 2,500 ulcers, perforation occurred

in only 4. Hemorrhage is also very rare. These exceptional features are consistent with the very striking tendency of the Indian abdomen to develop chronic rather than acute ailments. The duodenal ulcer tends to be chronic rather than acute. Large cicatrized masses of scar tissue with stenosis of the duodenum and tremendous dilatation of the stomach are extremely frequent. This condition is seen in over 40 per cent of all cases of ulcer of the duodenum and pylorus in Southern India.

Of 445 cases of duodenal ulcer treated by gastroenterostomy, postoperative gastrojejunal ulcer occurred in 28. In 16, its presence was proved surgically and in the remaining 12 was strongly suspected. The incidence of gastrojejunal ulceration after gastro-enterostomy was therefore 6 per cent.

In the choice of operation the emptying time is important. The authors have found that a duodenal ulcer which is definitely tender on palpation and associated with rapid emptying of the stomach and hyperchlorhydria is best treated by a gastrectomy of the Finsterer type. Other surgical procedures are likely to be followed by a jejunal or gastrojejunal ulcer. However, if there is delay in gastric emptying, the operation of choice is gastrojejunostomy unless the gastric acidity is very high. In gastrectomy the practice of leaving behind a portion of the pyloric end of the stomach has been adopted. The authors state that this results in "a free secretion of mucus in this region with which the ulcer is surrounded. This mucus will be a benefit to the intestine at the region of the anastomosis by decreasing the likelihood of recurrent ulcer." It is easier also to divide the stomach a slight distance away from the pylorus rather than close to it. Several of the deaths following gastrectomy were due to the difficulty in closing the pylorus near the sphincter.

Duodenal or pyloric ulcers are not attacked directly by the authors because "every surgeon knows that excision of a duodenal ulcer can be one of the most precarious and difficult of all abdominal operations. They invariably heal if one-way traffic is established by gastrectomy."

In the reviewed cases the mortality of gastrectomy was 6.5 per cent, but most of the deaths followed resection for either gastric or gastrojejunal ulceration.

Gastrectomy on a stomach which is not itself ulcerated, adherent, or inflamed, is not a dangerous operation if it is performed properly. An operation with a 2 or 3 per cent risk is preferable to the alternative anastomosis with an operative risk of 1.5 per cent which is followed by recurrence in 6 per cent of cases and by disturbances of some sort in over 10 per cent. SAMUEL J. FOGELSON, M.D.

Bulmer, E.: Histidine Treatment of Peptic Ulcer: A Study of 126 Cases with Immediate and Later Results. *Lancet*, 1936, 231: 734.

Bulmer reports the results obtained in the cases of 126 patients with peptic ulcer who have been treated with histidine since February, 1935. Patients with pyloric stenosis, possible malignancy, or active or recurrent hemorrhage, and those with no roentgenologically demonstrable abnormalities were excluded. Twenty-seven daily intramuscular injections of 5 c.cm. of histidine were given. This was practically the only treatment, but the patients were not asked to discontinue their accustomed diet and alkaline powder.

Ninety-two of the patients were rendered symptom free, 6 were greatly benefited, and 28 were not benefited. Of the 92 who were rendered symptom free, 26 remained symptom free for an average of sixteen months, 2 were greatly benefited, 15 had a relapse within three months, 20 had a relapse within six months, 10 had a relapse within twelve months, and 3 had a relapse within twenty-four months.

The author draws the following conclusions:

1. Ambulatory treatment with injections of histidine gave at least as good results as ambulatory treatment with a dietary alkaline regimen.
2. Histidine therapy should be reserved for simple uncomplicated cases.
3. Recurrences do not appear to be influenced by a single course of injections of histidine.
4. At the present time, histidine treatment should be regarded as an adjunct to simple dietary alkaline treatment.
5. The mode of action of histidine is unknown.

SAMUEL J. FOGELSON, M.D.

Goodall, J. R.: Mucous Colitis. *J. Obst. & Gynæc. Brit. Emp.*, 1936, 43: 925.

Goodall reviews a recent series of 200 cases of mucous colitis which were under observation over a period of five years. He states that the diagnosis is very elusive because the symptoms are so frequently referred to other organs. He recognizes 3 main types of the condition: (1) simple colitis; (2) complicated colitis, and (3) referred colitis (a) cardiac, (b) cerebral, (c) appendicular, (d) renal, (e) pulmonary, (f) cholecystic, (g) gastric, (h) pelvic, (i) rectal, (j) articular, and (k) muscular.

In simple colitis the chief symptom is pain. The patient often gives a history, dating back several years, of a dull ache over the entire abdomen with waves of intensity aggravated by indiscretions in diet, severe nervous strain, or sudden chilling of the body. When the pain becomes fixed and local it may be very difficult to exclude organic disease of other organs. When the cecum is involved, the appendix is often thought to be the source of the trouble. The combination of colitis and appendicitis is not unusual. The most common site of the pain is the sigmoid. When the sigmoid is involved constipation is the rule and often dates back to childhood. In a certain number of cases the bowels move daily, but the evacuations are incomplete. The great majority of patients report an excess of glairy mucus in the stools. When the cecum is the chief site of the trouble the stools are often scybalous and covered with a coating of inspissated white mucus.

Frequently the mucus is blood streaked and a strong purgative may cause the passage of considerable bright red blood. The pain and tenderness may be greatly aggravated by the cathartic. Physical examination of the abdomen may be quite negative, but this is not the rule. In most cases there is tenderness, local or general. The cecum, transverse colon, or descending colon may be very tender and spastic. Often it is possible to trace the affected bowel, which feels like a rope, through a certain segment of the abdomen.

French investigators have shown that persons with colitis are unable to digest meat fiber. Unstriated muscle is frequently found in the stools in large quantities. A milk and cooked vegetable diet, with fruit, both raw and cooked, and with the later addition of eggs is the best remedy to overcome the supersensitiveness of the bowel and the growth of putrefactive agents. Water should be taken freely. All that is required in addition is mild catharsis with castor oil followed by the regular administration of a laxative and of a mild sedative to allay the intestinal supersensitiveness. Mild bile laxatives together with the barbiturates are most effective. Luminal is one of the best agents to decrease the sensitiveness of the autonomic nervous system and quiet the intestines. The patient should be cautioned against eating too rapidly. Iced drinks and condiments should be forbidden, and highly seasoned foods and roughage should be excluded from the diet. Relapses are common.

JOHN W. NUZUM, M.D.

Mayo, C. W., and Wakefield, E. G.: Disseminated Polyposis of the Colon: A New Surgical Treatment in Selected Cases. *J. Am. M. Ass.*, 1936, 107: 342.

The method of treatment which the authors describe seems to have qualifications which still further advance the care of selected patients who have multiple polyposis of the colon. The normal outlet of the rectum and its sphincters is preserved, and the rectosigmoid and sigmoid flexure, which contain the nervous mechanism controlling the desire to defecate, are left intact. Therefore sufficient room is left for the storage of fecal material. Primarily, the operation has been made possible by the development of improved instruments and improved technique on the part of proctologists. Mayo and Wakefield were assisted by Buie and his colleagues in the Section on Proctology at the Mayo Clinic, who removed the polyps from the rectum, rectosigmoid, and sigmoid in order that segments which were free of polyps might be utilized in performing an ileosigmoidostomy.

The first stage of the operation is performed by the proctologist, who, with repeated applications of diathermy, removes a few polyps at a time as conditions permit until the rectum and rectosigmoid are free from polyps. The second stage of the operation is not performed until the rectum and rectosigmoid are free from polyps and the inflammation incidental to their removal. This stage of the procedure, which is performed through a right rectus incision, consists of end-to-side ileosigmoidostomy and hemicolectomy with removal of the right half of the colon and of as much of the transverse colon as can be removed with ease. In the performance of the ileosigmoidostomy care is taken to cut the ileum at an angle that insures not only a large stoma but also a good blood supply to the incised edge. The anastomosis is made along the longitudinal band with a serous layer of silk sutures and mucosal layers of sutures of chromic catgut. The angles of the anastomosis are protected with extra interrupted sutures of silk, which include epiploic tags whenever possible. The incised end of the remaining portion of the transverse colon, with a Payr clamp closing it, is brought out of the upper part of the right rectus incision after intra-abdominal raw surfaces have been covered with peritoneum. A rectal tube is fixed in the rectum to allow free passage of liquid and gas.

The third stage, which is carried out as soon as conditions permit, consists of hemicolectomy again, this time performed through a left rectus incision with removal of the remaining portion of the transverse colon, the splenic flexure, and the descending colon. The amount of colon to be resected may be judged by palpation of the polyps. As the proximal portion of colon is brought out of the wound, which makes it possible to fulgurate when necessary through the colonic stoma at a later date, it may be possible to save more of the colon than has been reached from below with the sigmoidoscope. In performing resection of the transverse colon it is important to preserve as much of the omentum and its blood supply as possible.

The fourth stage of the operation consists of retrograde examination and fulguration through the abdominal colonic stoma.

The fifth step is closure of the colonic stoma, which re-establishes the continuity of the intestine.

Strangely, little if any fecal drainage occurs through this colonic stoma at any time before closure. It may be left as a safety valve for a while and closed later, after repeated examination has revealed that the remaining portion of bowel is free from polyps.

With regard to the type of case to which this procedure is applicable the authors state that it cannot be used when secondary inflammation has involved the entire colon. This condition is best treated by ileostomy and total colectomy in stages after the inflammation has subsided. The surgical treatment described is of particular value in cases in which the diagnosis is made before complications have developed, particularly when carcinoma has not involved the colon distal to the sigmoid flexure.

As soon as multiple polyposis of the colon is diagnosed and the described method of treatment is considered applicable, the first stage of the operation should be started. While this is admittedly a formidable surgical procedure, it is the only known way of guarding the patient against repeated in-

testinal hemorrhages and carcinoma. In most cases, instead of being a prophylactic measure, the operation removes degenerated polyps and multiple carcinomas which are already present.

Of 19 patients under 41 years of age, 12 were women and 7 were men. The hereditary and familial tendencies, if present, do not admit any known genetic or biologic interpretation. In 6 of the patients a carcinoma was the predominating lesion at the time of operation. It has been said that the development of carcinoma in these colons is inevitable; that uncomplicated polyposis of the colon is symptomless; and that diarrhea and blood in the stools are not signs of polyposis but evidence of serious complications such as secondary infection, ulceration, or carcinoma. An ulcerative colitis may develop on an existing polyposis of the colon with subsequent disappearance of the polyps. The described new surgical procedure is designed to reduce the operative risk, conserve the distal segment of the colon and the entire rectum, and eliminate the necessity for permanent ileostomy.

Crocker, W. J., and Valentine, E. H.: Hemography in the Diagnosis of Appendicitis Based on 500 Cases. *J. Lab. & Clin. Med.*, 1936, 21: 883.

The authors state that they have modified the Schilling classification of neutrophils, and on the basis of a study of 500 cases of appendicitis treated at the Philadelphia General Hospital believe they can differentiate 8 degrees of appendicitis from the hemogram.

They describe the normal hemogram as consisting of 0 myelocytes, 0 juveniles, 4 stabs, 64 segmenters, a normal Schilling index of $^1/_{16}$ or a multiple index of 1.

They believe that much valuable information is obtained from a comparison of the number of neutrophil types, since a left shift with greater numbers of myelocytes and juveniles is indicative of a more serious state than a left shift consisting largely of stabs.

The 8 degrees of appendicitis they distinguish and the corresponding hemograms are as follows:

First degree or chronic fibrous appendicitis. White cell count, from 5,000 to 10,000; neutrophils, from 40 to 70; total shift cells, from 10 to 35; Schilling index, from $^1/_4$ to 1; and a left shift limited almost exclusively to stabs.

Second degree appendicitis, including those conditions commonly classified as chronic inflammations of the appendix. Instead of inflammation, however, there may be degeneration, atrophy, or hypertrophy. With vague symptoms and a history of recurrent attacks the hemogram is rather constant: white cell count, from 10,000 to 15,000; neutrophils, from 50 to 75; total shift cells, from 15 to 35; Schilling index, from $^1/_4$ to 1; and multiple index, from 5 to 17.

Third degree or acute suppurative early gangrenous appendicitis. With typical symptoms of acute appendicitis the hemogram is constant: white cells, from 15,000 to 30,000; neutrophils, from 75 to 95; total shift cells, from 15 to 35; Schilling index, from $^1/_{40}$ to $^1/_{10}$; multiple index, from 3 to 16; and lymphocytes, from 2 to 25.

Fourth degree or acute suppurative exacerbation of a chronic appendicitis. With a history of recurrent appendicitis and a present acute attack the findings are constant: white count, from 7,000 to 15,000; neutrophils, from 60 to 75; total shift cells, from 35 to 60; lymphocytes, from 20 to 40; Schilling index, from 1 to 3; and multiple index, from 16 to 48.

Fifth degree or acute suppurative appendicitis with rupture and a mass in the right lower quadrant of the abdomen, walled off. In the presence of a history and symptoms of rupture of the appendix and a mass in the right lower quadrant of the abdomen the characteristic hemogram is: white count, from 10,000 to 30,000; neutrophils, from 60 to 90; total shift cells, from 35 to 60; lymphocytes, from 5 to 30; Schilling index from 1 to 3; and multiple index from 16 to 48.

Sixth degree or acute suppurative appendicitis without rupture. In the presence of a history of a first attack and acute symptoms the hemogram is as follows: white cell count, from 7,000 to 30,000; neutrophils, from 75 to 95; total shift cells, from 35 to 60; lymphocytes, from 0 to 20; Schilling index from 1 to 3; and multiple index, from 16 to 48.

Seventh degree or acute suppurative appendicitis with rupture or impending rupture. In the presence of a history of a first attack and acute symptoms the hemogram is approximately as follows: white count from 6,000 to 35,000; neutrophils, from 80 to 95; total shift cells, from 60 to 75; lymphocytes, from 0 to 15; Schilling index, from 1.7 to 4; and multiple index, from 27 to 64.

Eighth degree or acute suppurative appendicitis with rupture and diffuse peritonitis. White cell count, from 5,000 to 40,000; neutrophils, from 75 to 100; total shift cells, from 75 to 100; lymphocytes, from 5 to 25; Schilling index, from 4 to 100; and multiple index, from 64 to 1,600.

Representative shifts as shown by the tables are exemplified by the following:

Degree	Myelocytes	Juveniles	Stabs	Segmenters
1	0	0	19	39
2	0	0	26	40
3	0	0	22	62
4	0	0	43	28
5	0	0	43	29
6	0	0	52	33
7	0	0	61	30
8	4	12	60	8

L. W. CHRISTIAN, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Henningsen, O.: A Clinico-Experimental Contribution on the Talma Operation (Klinisch-experimenteller Beitrag zur Talmaschen Operation). *Beitr. z. klin. Chir.*, 1936, 163: 229.

The object of the Talma operation is to produce artificial adhesions of the omentum and spleen to

the anterior abdominal wall and thus provide a collateral route for the blood which otherwise would go to the liver. This is done to prevent congestion in the region of the liver. The operation is performed especially in cases of atrophic cirrhosis of the liver although it is still unknown whether the ascites is due to stasis alone or whether toxic or infectious influences also play an important part in its occurrence. The operation is performed also in cases of biliary cirrhosis, cardiac cirrhosis, and Curschmann's disease; even in cases of ascites due to cardiac insufficiency. When there is icterus indicating injury of the liver the prognosis is unfavorable. The operation is contra-indicated also by vitium cordis with generalized hydrops. The only suitable cases are those in which there is interference with the portal circulation due to destruction of the central veins, i.e., cases of isolated portal stasis. The course of this condition is long. It is not until late that the chronic intoxication is manifested by ascites and bleeding from the digestive tract, particularly the esophagus (evidence of congestion in the region of the portal vein). After the appearance of these congestive phenomena the condition usually progresses very rapidly. The congestion can be relieved by the opening of new collateral channels. The functional state of the liver is also of importance. Icterus and acholia, xanthoma and pigmentation of the skin, and urobilinuria necessitate caution. With the beginning of icterus the prognosis rapidly becomes worse.

In an attempt to clear up this problem the author carried out experiments on animals. It is well known that experimental animals soon die when the portal vein is ligated before its entry into the liver. In experiments on 15 rats the author sutured the omentum intraperitoneally to the peritoneum over a large surface and placed the spleen in a pocket of the omentum. Ten days later he ligated the portal vein and severed it at the porta hepatis. The operation was well tolerated by all except 1 rat. The animals presented no differences from normal animals. However, it is possible that some of the blood reached the liver in spite of the developing collateral channels. The experiments prove merely that the portal circulation can be replaced by collateral channels by a procedure similar to the Talma operation. It is necessary only that the number of newly formed vascular anastomoses be large.

In another experiment, also performed on 15 animals, the functioning hepatic parenchyma was destroyed by the long-continued administration of phosphorus, the omentum was then fixed, and finally the portal vein was ligated. All of the animals died in from 3 to 20 days.

In another series of animals the common duct was tied off with a catgut suture at the same time that the portal vein was ligated, about 10 days after fixation of the omentum. The animals became icteric the next day, and all of them died. The hepatic injury had such serious functional sequelæ that the animals were unable to overcome them despite the exclusion of the portal circulation. This was true also of icterus. It is therefore evident that, despite the formation of sufficient collateral channels, such as those formed in these experimental animals, the progress of the disease is not always arrested. Therefore the Talma operation is not indicated in cases of severe injury to the liver with evidence of marked functional disturbances such as icterus and pronounced cholemia, and in cases of cirrhosis of the liver it should be done as early as possible, when the first signs appear. In cases of biliary cirrhosis of cardiac origin and in heart failure caution is necessary. On the other hand, in cases of Curschmann's disease, which is similar to atrophic cirrhosis of the liver, the operation may be attempted when the condition has an acute onset, and runs a slow course, and the patient can be kept under observation. When there is no indication of a slowing-up in the formation of ascetic fluid in spite of internal treatment and 1 or 2 paracenteses, the operation should be undertaken.

Spontaneous bleeding from the stomach and intestinal tract is an absolute indication for the operation, whether ascites is present or not. When severe hemorrhages occur from ruptured esophageal varices it is necessary, of course, to delay the operation to see if the patient will recover from the effects of the bleeding. The procedure must be very conservative. A small midline incision under local anesthesia is sufficient for either intraperitoneal or extraperitoneal fixation of the omentum. When the spleen is greatly enlarged a portion of the omentum should be sutured to its surface. In extraperitoneal fixation, abdominal hernia usually does not play an important rôle. The author disapproves of the suturing of loops of intestine together or of additional drainage of the abdominal cavity from the pouch of Douglas. He states that when the operation is performed in the presence of the indications cited and in the manner described the dangers are very slight. Therefore too much conservatism in the selection of cases is to be avoided. By the described treatment life can be prolonged and made more bearable for a period ranging from months to years. (Erich Hempel). John W. Brennan, M.D.

Titone, M.: The Shape and Function of the Gall Bladder Before and After Appendectomy (Morfologia e funzionalità della vescichetta biliare prima e dopo appendicectomia). *Arch. ital. di chir.*, 1936, 44: 1.

Titone made a series of cholecystograms in 25 cases of subacute and chronic appendicitis before and at intervals of from eighteen to sixty days after simple appendectomy. None of the patients had symptoms referable to the gall bladder.

The findings in the subacute and chronic groups were similar. In some cases the appearance of the gall bladder was entirely normal both before and after operation. In others, before the operation, the gall bladder was in ptosis and unusually large,

its shadow was faint, and its contours were blurred. The rate of emptying was usually within normal limits, but in a few instances it was either retarded or accelerated. These conditions are neither absolutely pathologic nor strictly normal, and are difficult to interpret.

After appendectomy, changes in shape or motility, or both, were observed in some instances. These consisted usually in a decrease, but occasionally in an increase, in the size of the vesicular shadow and retardation or acceleration of the rate of emptying, sometimes with changes in its beginning and rhythm. Differences in form and size were more pronounced than changes of position, intensity of shadow, or clearness of outline.

The findings demonstrate that an inflamed appendix can influence the shape and dynamics of the gall bladder in the absence of extrinsic or intrinsic anatomic lesions of the biliary tract, and that removal of the appendix can modify pre-operative conditions. In some cases these repercussions are the expression of nervous connections between the appendix and biliary tract through the solar plexus. The appendix has no exclusive or characteristic action on the biliary tract. The relative frequency of its effects upon the latter is due to the relative frequency with which it is inflamed. These effects occur in only a rather small proportion of cases, probably only when the neurovegetative system is unusually labile. They vary according to the nature and intensity of the stimulus and whether it is chiefly vagal or sympathetic. Vagolabile individuals are most often affected. In some cases, however, the gall-bladder changes are due to an attenuated inflammation of its serosa dependent upon an infective focus in the right abdomen, most often appendicitis.

The reviewed cases are reported in detail with the cholecystograms, and the article is followed by a bibliography. M. E. MORSE, M.D.

Illingworth, C. F. W.: The Formation of Gall Stones. *Edinburgh M. J.*, 1936, 43: 481.

Modern observations on the formation of gall stones may be said to have begun in 1892 with the publication of Naunyn's monograph entitled "Die Klinik der Cholelithiasis." Naunyn expressed the opinion that differences in the structure or chemical constitution of the different types of gall stones are due to secondary changes taking place after the formation of the stones. He believed that all gall stones originate in stagnant bile as the result of a "lithogenous catarrh" of the wall of the gall bladder, and that their main constituents, cholesterol and calcium salts, are derived from cells of the mucous membrane which are shed into the cavity of the gall bladder as the result of the inflammatory process.

As at the time of Naunyn's work the majority of gall stones recognized clinically were accompanied by gross cholecystitis, it is not surprising that infection was regarded as an essential factor in the stone-forming process. However, more recent observations have shown that this theory is not applicable to all gall stones although it is still held, in modified form, in regard to the common laminated "mixed" type of stone.

The modern conception of gall-stone formation we owe to Aschoff and Bacmeister. In their monograph, "Die Cholelithiasis," they expressed the opinion that the great variations in appearance, structure, and chemical composition of the different types of stones are clear proof of different modes of origin. The solitary cholesterol stone, pure in color and chemical composition and almost entirely crystalline in structure, has nothing in common with the small black pigment concretions, and the latter are entirely different in character from the common faceted or laminated stones of mixed composition. Therefore the causes and modes of origin of gall stones can be determined only by considering the different types of stones individually.

Illingworth recognizes 4 main types of stone: (1) single pure cholesterol stones, (2) multiple pure cholesterol stones, (3) pure pigment (bilirubin-calcium) stones, and (4) stones of mixed composition (cholesterol-bilirubin-calcium stones).

THE SINGLE CHOLESTEROL STONE

The single cholesterol stone has a quite distinctive appearance. It is ovoid or rounded, smooth or somewhat nodular on the surface, light in weight, and pale yellow. It may become larger than a pigeon's egg. Its most striking characteristic is its radiate crystalline structure. When it is cut across or fractured, it is seen to be composed almost entirely of coarse yellowish or white crystals which are clearly visible to the naked eye. The crystals are disposed radially and extend from the center of the stone to its periphery.

In some cases the structure of the stone is crystalline throughout, and chemical analysis showed that at least 95 per cent of its dry weight is due to cholesterol. In other cases a small amount of pigmented material is found in the interstices of the crystalline structure at the center of the stone.

Quite frequently, as the result of secondary infective changes, the originally pure solitaire becomes coated with a shell of mixed deposits containing pigment and a variable amount of calcium. Stones of this type are known as a cholesterol-combination stones and are often accompanied by multiple faceted stones formed at the time of the formation of their outer shell.

The author attempts to prove: (1) that the cholesterol solitaire is an aseptic formation; (2) that it is crystalline from the time of its origin; and (3) that it is formed by the precipitation of cholesterol derived from the bile.

1. *The cholesterol solitaire is an aseptic formation.* While many pure cholesterol stones are associated with cholecystitis, especially in operative cases, this may well be due to the fact that such stones give rise to few symptoms when they are aseptic and demand surgical treatment only when secondary infection

has occurred. In a statistical summary of the findings in cases of gall stones coming to autopsy at the Leeds General Infirmary, Gross found that only 3.2 per cent of solitary cholesterol stones were accompanied by cholecystitis. Moreover, in an uncomplicated case of pure cholesterol stone the gall bladder is thin walled, free from adhesions, and of a normal blue-green color; histological examination reveals no evidence of inflammatory change; and bacteriological investigation fails to demonstrate the presence of organisms. While it is possible that in such a case the formation of the stone may have been due to a transitory infection of the bile persisting long enough to set up the process of cholesterol precipitation and then disappearing completely, there is no proof of this.

2. *The cholesterol solitaire is crystalline from the time of its origin.* Meckel von Hemsbach, one of the earliest investigators to study the formation of the cholesterol solitaire, advanced the theory that, at first, the solitaire is an amorphous stone composed of mixed deposits and similar to the large, soft, brownish amorphous stones not infrequently found in inflamed gall bladders. As it is known that certain mineral deposits, primarily amorphous, tend in the course of centuries to assume a crystalline structure, Meckel von Hemsbach advanced the theory that amorphous gall stones may undergo a slow process of secondary cholesterolization whereby cholesterol crystals forming within the amorphous mold gradually displace the other constituents of the stone completely. Illingworth believes, however, that the outer crust is due to infective changes and is entirely a secondary deposit. In support of his opinion he states that stones not subjected to infective complications are invariably crystalline throughout, and the younger the stone the more certain it is to be entirely crystalline.

3. *The cholesterol solitaire is formed by the precipitation of cholesterol from the bile.* It was Naunyn's view that the cholesterol in gall stones is derived from epithelial cells from the surface epithelium of the gall-bladder mucosa. However, while such cells undoubtedly contain a considerable amount of cholesterol, they must be very scanty except in catarrhal conditions and even in the latter could hardly form an adequate source for the large amount of cholesterol required for the building up of a large gall stone. Subsequent writers, modifying Naunyn's view, expressed the opinion that cholesterol is derived from secretion poured out from the gall-bladder wall. It is now known, however, that, in health, the gall bladder secretes little or no cholesterol. On the other hand, the bile normally contains a large amount of cholesterol. The problem of cholesterol stone formation is therefore the problem of cholesterol precipitation from bile. Cholesterol precipitation is favored by any of the following changes in the composition of the bile: (1) an increase in the cholesterol content, (2) a decrease in the bile-salt content, and (3) a qualitative alteration in the bile salts or in the combination of cholesterol and bile salts. The cause of a change in the relative amounts of cholesterol and solvent substances may be found in either faulty secretion of the liver or secondary changes imposed on the bile in the gall bladder.

It is known that the amount of cholesterol secreted by the liver varies considerably and may be increased even 3-fold by simple starvation. It is known also that the amount of bile salts secreted is subject to great variations both in health and disease. It is reduced, for example, by a diet rich in sugar and to an even greater extent in conditions of liver impairment such as may be produced experimentally by the administration of chloroform or phosphorus.

Pure cholesterol stones are commonly found with cholesterosis of the gall bladder, itself a metabolic disorder. Moreover, it has been shown statistically that pure cholesterol stones are related to obesity and perhaps also to diabetes.

The crystallization of cholesterol from the bile is due to a change in the relative proportions of cholesterol and its solvent substances. The cholesterol becomes more and more highly concentrated and eventually precipitates. In its precipitation the presence in the bile of some particle capable of acting as a nucleus is probably of importance. Many pure cholesterol stones have a central area of pigmentation which may represent the original nucleus. It is possible that in some cases a mass of desquamated epithelial cells or even a clump of bacteria may be sufficient to start the process of crystallization.

As to the length of time required for the formation of a large pure cholesterol stone, little is known. However, it is generally thought that a pure cholesterol stone forms slowly and increases in size gradually over a period of months or years, and it is certainly true that the larger solitaires, 2 in. or more in length, are found most often in elderly persons whereas the smaller and presumably more recently formed stones are more common in younger persons. When cut across, some large cholesterol stones exhibit concentric layers similar to those in the trunk of a tree, indicating intermittent crystallization.

MULTIPLE PURE CHOLESTEROL STONES

Like solitary pure cholesterol stones, multiple stones of this type appear to be aseptic in origin although cholecystitis may supervene before surgical treatment becomes necessary. Also like solitary stones, they are often associated with cholesterosis of the gall bladder.

Multiple cholesterol stones vary considerably in appearance and structure, and without doubt originate in different ways. They are of 2 types:

1. Smooth regularly sized stones formed by crystallinization of cholesterol from the bile. Multiple pigment nuclei at the time of crystallization are responsible for their multiplicity.

2. Irregularly sized lobulated "unripe mulberry" stones.

PURE PIGMENT STONES

Pure pigment stones are not common in Great Britain. Of 300 cases of gall stones studied, they

were found in only 5.6 per cent. They are generally multiple, small, rounded, and of a metallic hardness. Occasionally they become 1 cm. in diameter and are nodular like a blackberry or irregular in shape. They are usually dark gray or black, and when cut across are seen to be homogeneous and composed of amorphous material. Chemical analysis shows that they contain bilirubin in combination with calcium. Cholesterol is generally lacking. Rarely, stones of this type are greenish throughout because of the presence of biliverdin.

They are essentially aseptic formations, the result of the precipitation of bilirubin and calcium from the bile. They may be found in the gall bladder or the bile ducts, and it appears likely that they may originate in either site.

The presence of an excess of bilirubin seems to be one of the essential causative factors. Pigment stones are a common complication of such conditions as hemolytic jaundice in which there is excessive destruction of red blood cells and consequently an increase in the amount of bilirubin excreted by the liver. They may be formed also after partial or intermittent obstruction of the inflow of bile, though they are by no means always attributable to such a cause.

STONES OF MIXED COMPOSITION

The common gall stones are of a mixed composition. They consist of variable proportions of cholesterol, bile pigment, and calcium salts in addition to a considerable amount of albuminous matter and sometimes traces of iron, copper, and other metals. They have an amorphous, brownish center and a harder shell which is often laminated.

They are usually multiple, sometimes numbering several hundreds. When they are numerous they are faceted by mutual pressure. In some cases there is a single stone, perhaps forming an accurate cast of the shrunken gall bladder, or there are 3 or 4 barrel-shaped stones.

As Naunyn maintained, there can be little doubt that stones of this type are of infective origin. It seems most probable that they are formed by the interaction of bile and an inflammatory exudate (mucopus). According to Lichtwitz, the precipitation is determined by the fact that bile is an electronegative colloid solution whereas inflammatory exudate is electropositive, and when mixed they effect a mutual precipitation. As the process takes place rapidly, no crystallization occurs and the stones remain amorphous throughout. The composition of the stones varies according to the amount of bile present and the nature of the inflammatory exudate. Therefore the stones may be heavily pigmented or pale gray.

According to Aschoff, an essential factor in their formation is a temporary occlusion of the cystic duct by either an aseptic stone or an inflammatory edema. The obstructed infected gall bladder fills with mucopus, but no precipitation occurs as bile is absent. The stones are formed later when the obstruction of the cystic duct is relieved and fresh bile enters the gall bladder and comes into contact with the mucopurulent content. JOHN J. MALONEY, M.D.

Sandblom, P., Bergh, G. S., and Ivy, A. C.: Cholecystoduodenostomy Combined with Pyloric Exclusion. *Ann. Surg.*, 1936, 104: 702.

In experiments on dogs attempts to prevent ascending infection following bile-duct anastomosis by diverting the chyme so that it does not pass the anastomosis have been unsuccessful. To divert the chyme effectively it is necessary to perform pyloric exclusion in addition to gastro-enterostomy. Even after pyloric exclusion, some of the ingested material makes its way back into the duodenal loop.

Ascending infection usually results in man as well as animals following bile-duct anastomosis, but as the factor of safety in the liver is so large it rarely gives rise to clinical symptoms. Occasionally, however, a fatal infection ensues, especially if stasis of bile occurs. In some cases the development of peptic ulcer constitutes an added danger. For these reasons it seems unwise to extend the indications for the operation.

In the presence of an irremovable obstruction in the terminal portion of the common bile duct, simple anastomosis of the gall bladder to the stomach or duodenum is a satisfactory operation. More complicated procedures add to the operative risk without presenting any definite advantages.

A normally functioning sphincter of Oddi or choledochoduodenal mechanism plays an important rôle in the prevention of cholangeitis and dilatation of the bile ducts. SAMUEL KAHN, M.D.

Eliot, E., Jr.: Benign Cicatricial Strictures of the Bile Ducts. *Ann. Surg.*, 1936, 104: 668.

Partial or complete division of the common or hepatic duct in the course of cholecystectomy is unquestionably the most frequent cause of benign strictures due to cicatricial tissue in the wall of the duct. Abnormalities in the course, length, and termination of the cystic duct and variations in the course, origin, and distribution of the cystic artery are important predisposing causes. The pressure of a hemostat on a portion of the duct wall may also be responsible for subsequent stricture. Benign strictures are usually associated with biliary fistulas.

The symptoms of a benign stricture occurring without a previous operation are usually those of the gradual development of jaundice with or without occasional attacks of cholangeitis.

Benign strictures vary in their location and extent. Strictures of the hepatic duct just above its junction with the cystic duct usually follow cholecystectomy and are localized. Strictures in the common duct occur more frequently at or near the ampulla. Strictures due to septic cholangeitis are generally diffuse and may involve the greater part of both the common and the hepatic duct.

Operative measures, which vary according to the location and extent of the stricture, are of the following types:

1. End-to-end anastomosis after excision of the stricture. This may be done when the orfices of the duct can be approximated without undue tension.
2. Choledochoduodenostomy. This is done when the stricture involves the terminal portion of the common duct.
3. Hepaticoduodenostomy, hepaticogastrostomy, or hepaticojejunostomy. The indications for these procedures are strictures which involve such a large portion of the common duct that neither of the preceding operations is possible.
4. Reconstruction of a new duct by the tube method (Wilms).
5. Implantation of the biliary fistula into the stomach, duodenum, or intestine.
6. Cholecysto-enterostomy. This is done in cases of stricture of the common duct in which both the gall bladder and the cystic duct are normal.
7. Dilatation of a stricture with the insertion of a buried tube.
8. Choledochotomy, or simple division of the stricture.
9. Hepato-enterostomy, the approximation of denuded liver tissue to the duodenum or small intestine. This is done when the stricture involves the hepatic duct within the liver and dilatation of the stricture cannot be carried out or has failed to give relief.

While striking results have at times followed each of these measures, with the exception of the last 2, failures are not uncommon. Either the stricture recurs within a year or a septic cholangeitis of increasing intensity proves fatal. Recurrence of the stricture is less likely if, in the operative anastomosis, the mucous membrane of the divided ends of the duct or of the duct and intestine can be approximated and sutured without tension. In the absence of infection conditions are then favorable for primary union, and if the line of suture is not torn apart in the later withdrawal of the tube from within the duct, the stricture is not apt to recur.

An accurate estimate of the relative value of these operative procedures is impossible. In general, the selection of the more simple operation is indicated. When practicable, end-to-end anastomosis after excision of the stricture affords an excellent chance of success. In strictures of the common duct, choledochoduodenostomy or hepatoduodenostomy, especially when the mucous membrane of the duct can be approximated to that of the stomach or intestine without tension, is evidently the operation of choice. Duct reconstruction by the Wilms' method has usually not given encouraging results. Implantation of biliary fistulas into the stomach or duodenum appears preferable. Either one or the other of these 2 procedures or anastomosis of the duct to the jejunum must be attempted when the greater part of the hepatic and common ducts is obliterated.

Treatment of strictures of the hepatic duct within the liver still presents a most difficult problem. An attempt should be made to establish a fistula with the dilated portion of the duct or with a segment of liver parenchyma, previously penetrated with the cautery, which subsequently may be transplanted into the stomach or duodenum.

SAMUEL KAHN, M.D.

Beckman, T. M.: Contributions to the Diagnosis of Surgical Conditions of the Pancreas (Contributions au diagnostic des pancréatites chirurgicales). *Actachirurg. Scand.*, 1936, 78: Supp. 44.

The most important clinical symptom in pancreatic disease is pain. From a study of the pain and its radiation the author has come to the conclusion that it probably does not originate from pressure on the cœliac ganglion, as was formerly believed, but is due to local irritation of the nervous elements within the gland itself. The various radiations of the pain are probably related to the site of the pathologic process within the gland. The pain does not occur preponderantly on the left side.

The general toxic signs as well as the symptoms referable to a disturbance of hepatic and renal function, such as icterus, urobilinuria, an increase of the non-protein nitrogen, and hematuria, are not of any great diagnostic importance, but are significant with regard to the prognosis. The resistance of the red blood cells in the various pancreatic disease groups is of no great aid in the diagnosis or the determination of the prognosis.

In chronic pancreatitis and in pancreopathy, palpation of the pancreas in the opened abdomen is of great diagnostic value. This is to be preferred to biopsy because of the danger of necrosis and the formation of fistulas.

From the anatomicopathological point of view, the author believes that the old classification of pancreatic disease into acute necrosis, acute pancreatitis, and chronic interstitial pancreatitis does not conform to clinical observations. He has accepted the classification of Zoepffel, Schmieden, and Walzel who subdivide acute pancreatic necroses into edemas and pancreatic necroses. The term "pancreopathy" coined by Katsch and von Bergmann includes all mild and reversible forms of pancreatitis.

Trauma, especially surgical trauma, often gives rise to pancreatic lesions. Other etiologic factors are biliary stones, infections of the biliary passages, and duodenal ulcers.

The pathogenesis of pancreatic disease has been the subject of much controversy. The author favors the neurovascular theory advanced by Knape-Ricker. Although this theory is not entirely satisfactory, Beckman has used it as the basic hypothesis of his study. He calls attention to the fact that as the gland undergoes continuous changes any irritation is capable of producing a large number of different morbid conditions.

Of great diagnostic importance in pancreatic disease are functional tests. The demonstration of specific pancreatic ferments in the serum and urine constitutes a very important aid in the diagnosis

of surgical conditions of the pancreas. The most important diagnostic method from the surgical point of view is the determination of diastase. It should be remembered, however, that an elevated diastase value throws no light on the nature of the pathologic process in the pancreas and that a normal diastase value does not definitely exclude the presence of a pathologic process in the pancreas. The normal diastase value in the serum as determined by Ottenstein's method ranges from 100 to 300 mgm. per cent and averages 170 mgm. per cent. The author has studied also the variations in the serum diastase following the administration of glucose.

In determinations of the atoxyl-resistant lipases in 214 normal cases Beckman found that this fraction may increase in the serum in conditions such as advanced cachexia, pernicious anemia, endocrine disturbances, and thyrotoxicosis. Abnormal lipase levels are found also in certain chronic arthropathies, but aside from these exceptions, atoxyl-resistant lipase may be regarded as specific for the pancreas.

There is no parallelism between this latter reaction and the serum-diastase reaction. In acute pancreatic necrosis, diastase is already demonstrable from six to eight hours after the onset and disappears within two or three days whereas the lipase level usually increases after two or three days.

The author demonstrates the reliability of these tests by statistical data. In applying the tests to a series of patients with surgical conditions in the attempt to discover the presence of pancreopathies he found that these conditions are relatively rare in cases of gastric and duodenal ulcer whereas surgical procedures for ulcers are often followed by pancreatic reactions. The reverse seems to be true in disturbances of the biliary tract. Prior to the operation, especially in chronic conditions, the incidence of pancreopathies is high, whereas following cholecystectomy the pancreatic disturbances disappear.

In carcinoma of the pancreas the values of diastase and lipase rise above normal in about half the cases. RICHARD E. SOMMA, M.D.

Riesman, D., Kolmer, J. A., and Polowe, D.: Splenectomy in the Treatment of Subacute Bacterial Endocarditis. *Am. J. M. Sc.*, 1936, 192: 475.

The authors report in detail 4 cases of bloodstream infection treated by splenectomy and review the literature on splenectomy in septic conditions, particularly subacute bacterial endocarditis. It has been suggested that in these conditions the spleen may act as a focus for the multiplication of bacteria and the formation of toxins. In the majority of cases the spleen is enlarged and the site of multiple infarctions. Because of these possibilities and facts the authors propose splenectomy for the treatment of subacute bacterial endocarditis.

In the first case they report, that of a man fifty-seven years of age, the symptoms and physical findings led to a diagnosis of subacute bacterial endocarditis. The patient showed marked improvement following splenectomy, but died four weeks later from an abscess of the larynx.

The second case was that of a woman twenty-five years of age, with a positive blood culture of gram-positive non-hemolytic streptococci and enlargement of the spleen. As intensive treatment resulted in no improvement the enlarged spleen was removed. The operation was followed by immediate relief of the joint and abdominal pains and improvement in the red-cell count and hemoglobin. However, the fever and showering of emboli continued and the patient died within a few weeks, probably of a cerebral embolus.

The third case was that of a boy twenty-two years of age with a clinical picture typical of subacute bacterial endocarditis. Blood cultures were positive for streptococcus viridans. An enlarged spleen with many infarcts was removed. The operation was followed by immediate general improvement for ten days, but the clinical symptoms then recurred and the patient died two months later.

In the fourth case, that of a man thirty-nine years of age, a probable diagnosis of mural subacute bacterial endocarditis was made. Following failure of all the usual methods of treatment splenectomy was performed as a last resort. Bacteriological examination of the spleen showed a pure culture of streptococcus viridans. The postoperative course was somewhat stormy. Since his discharge from the hospital the patient has gained 60 lb. and has been well for five months.

The authors conclude that splenectomy may prove to be a method of treatment in the intractable form of sepsis without a discoverable focus in which splenomegaly is a prominent feature. It promises the best results in cases in which acute bacterial endocarditis is suspected, but unproved.

ROBERT ZOLLINGER, M.D.

GYNECOLOGY

UTERUS

Arneson, A. N.: The Distribution of Radiation Within the Average Female Pelvis for Different Methods of Applying Radium to the Cervix. *Radiology*, 1936, 27: 1.

In a previous article the author published diagrams showing the distribution in the average female pelvis of roentgen irradiation given by a variety of methods. For the treatment of cancer of the cervix an arrangement employing 6 fields was found to be most satisfactory when irradiation was delivered with 200 kv., filtration by 0.5 mm. Cu and 2.0 mm. Al, and a target-skin distance of 70 cm. In this arrangement 2 fields were used on the anterior surface, 2 on the posterior, and 1 on each lateral aspect of the pelvis. Each field measured 10 cm. transversely and 15 cm. longitudinally. On the anterior and posterior surfaces the beam was always directed straight toward the underlying parametrium in order to protect the bladder and rectum.

In this article Arneson discusses radium irradiation and presents diagrams showing its distribution in various conditions in which radium is used alone or in association with roentgen irradiation. He states that in cancer of the cervix, radium applied to the cervix will control the disease in the primary focus and external roentgen irradiation will help to treat parametrial and outlying tumor-bearing regions more adequately. In order to be able to express both types of irradiation in the same unit, the threshold erythema dose is employed. This is defined as the amount of irradiation which, given at a single exposure, produces a visible reddening or bronzing of the skin within 4 weeks in 80 per cent of cases. In the case of the roentgen rays it is 525 r (measured in air) with 200 kv., filtration by 0.5 mm. Cu, and a field measuring 10 by 10 cm. In the case of radium it is approximately 225 mgm.-hr. given with a tube 2 cm. long at a distance of 1 cm. If other qualities or sources are used, the values appear different.

The diagrams for radium irradiation show the distribution from an intra-uterine tandem source consisting of 2 capsules, with doses of 3,000 and 5,000 mgm.-hr.; from an intra-uterine tandem source (3,000 mgm.-hr.) in conjunction with needles (1,500 mgm.-hr.) inserted into the cervix; from an intra-uterine tandem source (3000 mgm.-hr.) in conjunction with a radon bomb (1,500 mgm.-hr.) or a radium plaque (1,500 mgm.-hr.) placed against the cervix; and from an intra-uterine tandem source (3,000 mgm.-hr.) in conjunction with a source of radium of 1,000 mgm.-hr. located by means of a colpostat in each lateral vaginal fornix (total 2,000 mgm.-hr.).

Those for combined roentgen and radium irradiation show the distribution in the horizontal, transverse, and median sagittal planes in the treatment of cancer of the cervix through 6 fields by roentgen irradiation and by the application of an intra-uterine tandem and intravaginal colpostat for the radium irradiation. From the diagrams it is possible to estimate the irradiation distribution at various points, between which there are differences of several threshold erythemas. While no one plan is suitable for the treatment of all cases, the author recommends that this procedure be followed in the treatment of cancer of the uterine cervix whenever possible. He believes that further advance will

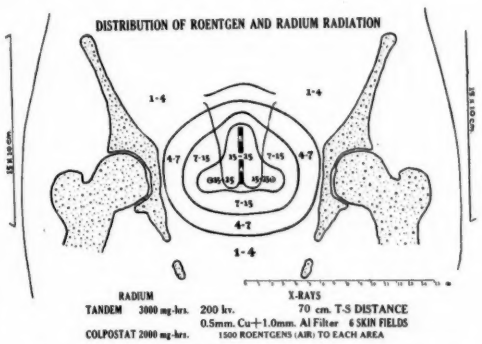


Fig. 1. The distribution of roentgen and radium irradiation in the average female pelvis in the methods and with the doses specified.

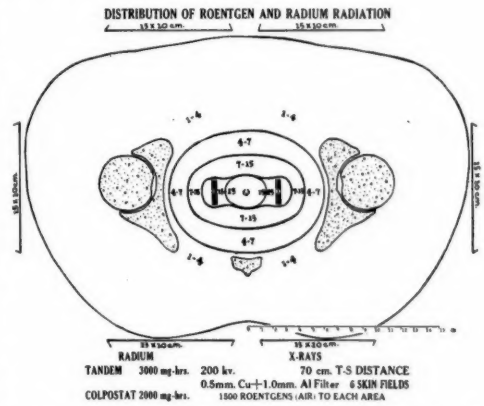


Fig. 2. The distribution of roentgen and radium irradiation in a transverse section of the average female pelvis.

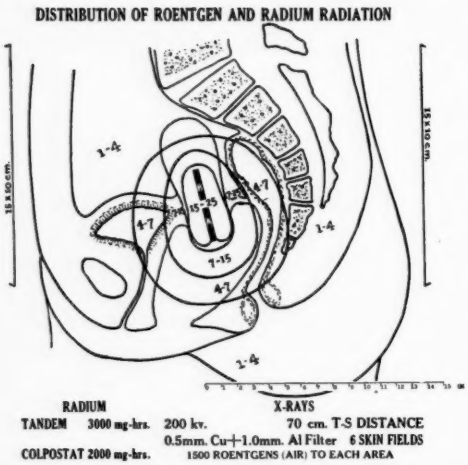


Fig. 3. The distribution of roentgen and radium irradiation in a median sagittal section of the average female pelvis.

probably be made by improving the method of external roentgen irradiation, but little may be expected from changing the technique of radium application to the primary lesion.

T. Leucutia, M.D.

Hausding, H.: Irradiated Cervical Carcinoma. A Critical Consideration of the Determination of the Prognosis (Die Epikrise des bestrahlten Collumcarcinoms. Eine kritische Betrachtung zur Prognosestellung). *Strahlentherapie*, 1936, 55: 387.

After reviewing the literature dealing with the problem under consideration the author first describes the method used in studies of 240 cancers of the uterine cervix which were treated in the period from 1923 to 1928. The specimens of tumor tissue were removed by excision, excochleation, or the use of the cold-cautery snare. In order to obtain entirely unaltered tissue for histologic examination they were always removed before the irradiation was begun. The staining was done by the usual hemotoxylin-eosin method. In order that subjective error in judging the degree of differentiation might be reduced to the minimum, serial sections were studied and the diagnosis was based upon the predominant findings. In addition, repeated examinations of the specimen were made in order to reach the most certain and objective decision. In each specimen 25 fields were examined.

The author first attempts to answer the question whether it is possible to determine the prognosis from the degree of differentiation and the number of mitoses shown by an excised specimen of carcinoma.

Of the total number of 240 cases of squamous-cell carcinoma of the uterine cervix, 55 (22.9 per cent) were of the well-differentiated type, 101 (42.1 per cent) of the moderately differentiated type, and 84 (35 per cent) of the undifferentiated type. These figures correspond approximately to those of statistics collected from the literature. The author states that in judging the degree of differentiation, certain subjective factors can never be eliminated entirely.

The relations between the degree of differentiation and the number of mitoses were determined. In this connection progressive atypicity of the tissue and the increase in karyokinetic figures may be regarded as evidence of malignancy and rapid proliferation. Moreover, the number of mitoses is greater the less the differentiation of the cancer. The percentage of cancers of the undifferentiated type which showed more than 100 mitoses in the 25 fields examined was 7 times greater than that of cancers of the well-differentiated type. These relationships are shown clearly by a curve.

The degree of differentiation and the prognosis of the cases are compared. Of the 240 cases, permanent cure was obtained in 32 (13.3 per cent). Among the latter there were twice as many cases of undifferentiated carcinoma as cases of well-differentiated carcinoma. On the other hand, of 99 carcinomas which were fatal, a somewhat greater number were of the undifferentiated than of the well-differentiated type.

To answer the question of the significance of numerous mitoses the author considers the sensitiveness to irradiation not only of the cancers which were cured for five years but also of those which were fatal in the first year after treatment. The problem is the relationship between the number of mitoses and the prognosis. Nearly 3 times as many cancers with few mitoses as cancers with numerous mitoses terminated fatally within the first year after treatment. Cancers with numerous mitoses were more sensitive to irradiation.

Finally the author discusses the principal question—the possibility of determining the prognosis from the degree of differentiation and the number of mitoses. His findings show that in the more atypical forms of cancer the incidence of five-year cure was twice as high in cancers with numerous mitoses as in cancers of the well-differentiated type. On the other hand, among those of the differentiated type there were twice as many with few mitoses as among those of the more atypical type. The absolute numbers of all 3 degrees of differentiation showed, with progressive atypicity of increasing irregularity of their histologic structure, a proportionate increase in the number of mitoses. This observation suggests the possibility that in atypical forms with an increasing number of mitoses (which is considered, not an absolute, but an important criterion of greater rapidity of growth) the incidence of five-year cure is higher than in the fully differentiated forms with numerous mitoses. However, a constant relationship between the degree of differentiation and the number of mitoses could not be determined.

Quite a number of the reviewed cases could not be placed in any classification from which definite con-

clusions could be drawn. The author cites 3 characteristic cancers with histologic pictures showing the danger of overevaluating irradiation.

In conclusion he says that, for practical purposes, establishment of the prognosis of irradiated cervical cancer on the basis of the microscopic findings alone has only conditional validity.

(G. SCHAEFER). DANIEL G. MORTON, M.D.

Scheffey, L. C.: Carcinoma of the Cervical Stump. *J. Am. M. Ass.*, 1936, 107: 837.

The reported incidence of carcinoma of the cervical stump varies considerably. The variation is due to unreported cases, diagnostic errors, and different conceptions as to what constitutes the condition. In 4,269 cases of carcinoma of the cervix collected from the literature, von Graff found that the incidence of carcinoma of the cervical stump reported for the different groups ranged from 2.5 to 11.3 per cent, and that in the total number of cases the average incidence was 4.1 per cent. Richardson believes that the incidence does not exceed 3 per cent. In 1,022 cases of cervical carcinoma reviewed by Kretzschmar and Gardiner it was 1.76 per cent. Of 273 cases of carcinoma of the cervix admitted to the Jefferson Medical College Hospital, Philadelphia, in the period from September 1, 1921, to September 1, 1935, 10 (3.66 per cent) were cases of carcinoma of the cervical stump.

The frequency with which carcinoma develops in the cervical stump can be determined only with relative accuracy as the follow-up of consecutive cases of supravaginal hysterectomy is difficult. In 7,244 cases collected from the literature by von Graff it was 0.62 per cent. In approximately 10,000 subtotal hysterectomies reported by a dozen surgeons, Richardson found it to be a little less than 1 per cent. Fahnrich reported that in almost 20,000 cases which he collected from the literature it was a little less than 0.04 per cent.

Scheffey was able to follow up 554 patients who were subjected to supravaginal hysterectomy. Of these, 5 (0.902 per cent) developed carcinoma of the cervical stump. He admits the inadequacy of the follow-up in many of the cases.

He analyzes 10 cases of carcinoma of the stump with reference to whether the carcinoma was present at the time of the operation or developed later. He states that this decision cannot be based entirely on the time elapsing between the operation and the discovery of the cancer. The presence of cancer can be proved only by biopsy or amputation. In 3 of the 10 cases the carcinoma probably existed at the time of the operation, and in 2 it may possibly have been present at that time. In the 5 others it appeared from six to twenty-one years after the operation and therefore probably developed postoperatively. Failure of recognition in the first 5 cases might have been avoided by more careful study.

Healy and Arneson have emphasized the hazards of both surgery and radium in the treatment of carcinoma of the stump of the cervix. By a careful irradiation technique they obtained a five-year cure in 14 per cent of cases. In a series of cases collected by von Graff, the incidence of five-year cure was 9.3 per cent. Meigs reported a 7.6 per cent incidence of cure. Recently Sackett reported statistics from the George Gray Ward Clinic showing that the incidence of five-year survival was 48.4 per cent.

In the 10 cases reviewed by Scheffey the incidence of five-year cure was 42.8 per cent. Four cases were treated with radium alone. A short bomb was placed in the canal and radium needles were employed around the periphery. In 5 cases this treatment was combined with high-voltage x-ray irradiation. In 1 case, only x-ray irradiation was used. The author emphasizes the importance of protecting the normal surrounding tissue by liberal packing.

In discussing the measures which should be taken to prevent the development of carcinoma of the cervical stump, Scheffey states that the association of fibromyomas with cancer of the cervix has been noted for a long time. Cervical carcinoma has been associated also with damage and disease of the cervix. Most hysterectomies for non-malignant conditions of the uterus are for fibromyomas or are performed in cases in which the cervix is diseased. Therefore it would seem that the performance of panhysterectomy in all such cases would be a proper measure for the prevention of cancer of the cervical stump. Scheffey believes that the incidence of cancer of the stump is comparatively less than the greater mortality and morbidity resulting from complete hysterectomy as compared with supravaginal hysterectomy when these operations are performed by the average surgeon. Siddall and Mack found that in a collected series of 4,559 cases in which the complete operation was performed the mortality was 3 per cent, and in 7,795 cases in which the subtotal operation was done it was 2.6 per cent. In their own cases, the mortality of total hysterectomy was 6.4 per cent, and that of supravaginal hysterectomy, 2.6 per cent. Richardson agrees that panhysterectomy is usually more dangerous than supravaginal hysterectomy.

Scheffey therefore believes that the performance of panhysterectomy as a routine procedure is not rational even in the presence of disease of the cervix. In lieu of routine panhysterectomy he recommends thorough preliminary examination of the cervix with biopsy, and with cauterization or cervical resection if necessary. He believes that such a careful examination should be made even when the pelvic pathologic condition is apparently well defined. For some cases presenting no insurmountable technical difficulties he recommends the complete operation. Of the 554 patients he followed up after supravaginal hysterectomy, 170 received treatment of the cervix prior to the operation. Of the latter, cancer of the stump is known to have developed in only 1 (0.508 per cent). Of the 384 patients who were not given such pre-operative treatment, cancer of the stump developed in 4 (1.04 per cent).

DANIEL G. MORTON, M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Frankl, O.: Hydrosalpinx (Zur Hydrosalpinxfrage). *Ztschr. f. Geburtsh. u. Gynaek.*, 1936, 113: 1.

In hydrosalpinx there are adhesions of folds and pseudofollicles are formed even without a preceding pyosalpinx. The epithelium may become flattened by pressure. Not rarely, unusually wide and numerous blood vessels are seen in the folds. Inflammatory infiltration may be present not only in the early stages, but may persist for quite a long time. On the other hand, it may be entirely absent in the early stages. The author does not agree with the opinion that the hydrosalpinx fluid is merely retained normal secretion of the tube. He states that it must be either a transudate or an exudate. A low specific gravity, a decreased albumin content, and the absence of inflammatory infiltration indicate transudation, while a high specific gravity, an increased albumin content, and the presence of inflammatory infiltration indicate exudation. A low specific gravity and a decreased albumin content in the presence of inflammatory infiltration indicate either the absence of exudation or dilution of an exudate by a transudate. A high specific gravity and an increased albumin content in the absence of inflammatory infiltration indicate a serous inflammation of the type described by Eppinger and his co-workers. An inflammatory origin of hydrosalpinx is suggested by the relatively frequent association of the condition with salpingitis isthmica nodosa.

It is impossible to differentiate an inflammatory early stage and a late transudative stage, but an active and a passive phase may be recognized. In the active stage the accumulation of fluid occurs with gradual distention of the tube, while in the passive stage there is no further accumulation of fluid. Circulatory disturbances with transudation are of the greatest importance in the development of hydrosalpinx, but endosalpingitis as a serous inflammation is another important factor which may not be limited to the primary stage of the process. The author does not believe that pyosalpinx develops directly into hydrosalpinx. For the term "hydrosalpinx," to which Aschoff objected, he suggests substituting the term "salpingitis serosa."

(Frankl). Leo A. Juhnke, M.D.

Solomons, B.: The Conservative Treatment of Pathological Conditions of the Fallopian Tube. *J. Obst. & Gynæc. Brit. Emp.*, 1936, 43: 619.

The author is of the opinion that conservative treatment of the fallopian tubes is to be considered only when salpingitis is believed to be the chief etiological factor in the given condition. He classifies salpingitis into acute and chronic types. He states that in acute salpingitis palliative treatment is the treatment of choice.

In a study of the fallopian tubes by the injection of iodized oil the tubes appear somewhat larger because they are dilated by the oil. As a rule they leave the uterus in a straight line. Anesthesia interferes with the peristalsis of the tubes. A definite relationship between rhythmical contraction of the fallopian tubes and the menstrual cycle seems to have been demonstrated. In Solomons' opinion, some of the cures of sterility from the injection of powerful hormones may be accounted for by this relationship, through an indirect action on the tubes. During the passage of the ova the fimbriated ends of the fallopian tubes remain passive. This fact may explain cures of sterility after removal of the fimbriated ends.

That the use of lipiodol is not harmless is shown by records in the literature of the occurrence of death in 5 and of infection in 13 of 2,000 cases in which lipiodol insufflation of the tubes was done.

The author agrees with others that insufflation of the fallopian tubes with air or their injection with an opaque material often results in cure of sterility.

To determine the attitude of gynecologists toward operation on the fallopian tubes, Solomons sent out 150 questionnaires. According to the replies, most gynecologists do not open the abdomen primarily for operation on the tubes, but if they perform a laparotomy for some other reason and find the tubes diseased they resect the ends of the tubes and separate adhesions. Some of them reported that they never operate upon the tubes; some, that they operate only on the fimbriated ends; and some, that they operate on all portions of the tubes. The incidence of successful results from operations on the fallopian tubes as determined by the subsequent occurrence of pregnancy was reported at about 10 per cent. Herbert F. Thurston, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Wójcicki, H.: The Sequelæ of Extra-Uterine Pregnancy (Folgen der Extrauterinschwangerschaft). *Ginek. polska*, 1936, 15: 29.

The author reviews 426 cases of extra-uterine pregnancy which were admitted to the Gynecological Clinic of the University of Warsaw in the period from 1921 to April 30, 1935. In 420 of these cases laparotomy was performed. The total number of deaths was 21, a mortality of 4.9 per cent. In 83 per cent of the cases the chief factor favoring the development of extra-uterine pregnancy was salpingitis from which the patient had recovered or which was still present. This was demonstrated by microscopic examination of the specimens removed in 206 cases. In 6 (3.5 per cent) of the cases tuberculosis of the tubes was found, and in 2, a malignant chorionepithelioma. In 35, no evidence of inflammation was noted. Of 3 women with simultaneous extra-uterine and intra-uterine pregnancy, 1 aborted immediately after laparotomy, 1 aborted at home several weeks after operation, and 1 had a normal delivery.

Experience shows that in cases in which extra-uterine pregnancy is suspected, curettage may interrupt the pregnancy. Therefore it should be done only in a hospital, where an immediate laparotomy may be performed if necessary. In only exceptional cases will the curetted specimen present proof of the presence of an extra-uterine pregnancy (decidua without chorionic villi). More frequently, the microscopic picture shows the changes of the menstrual cycle. The Aschheim-Zondek test is of value in the diagnosis of extra-uterine pregnancy only when it is positive. At operation, the possibility of a subsequent pregnancy should always be kept in mind. Therefore the procedure should be as conservative as possible. Under favorable conditions salpingostomy may be done.

According to the replies to a questionnaire, the incidence of recurrence of extra-uterine pregnancy in the cases reviewed was 3.2 per cent and the incidence of subsequent normal pregnancy 36.8 per cent. Therefore the theory that to prevent recurrence of extra-uterine pregnancy it is necessary to remove the non-pregnant tube as well as the pregnant tube even if the former is macroscopically normal is not justified.

In follow-up examinations of 32 women whose cases are reviewed it was found that the incidence of adnexal tumors and indurations was higher after the less radical operations, and that the incidence of pain was higher after the more radical operations (adnexectomy, salpingectomy, supravaginal amputation of the uterus).

(Beck). John W. Brennan, M.D.

Berkeley, Sir C.: Unavoidable Hemorrhage. *J. Obst. & Gynæc. Brit. Emp.*, 1936, 43: 393.

This article is based on 5,107 cases of placenta prævia occurring in 500,988 obstetrical cases. A critical study was made of only 4,580 as in the records of 537 certain details essential for such a study were omitted.

Some authorities criticize adversely the presentation of massed statistics, especially from foreign sources, maintaining that, since most readers do not know the authors personally, their standing, or their technique, they are unable to interpret such figures correctly. However, so far as the majority of British readers are concerned, this criticism is not applicable to the statistics presented in this article as they are based on the practice of professors of obstetrics in maternity hospitals and chiefs of the maternity departments of general hospitals in England, Wales, Scotland, Northern Ireland, and the Irish Free State. Most of the reports cover the period of the last 5 years, but 4 cover a longer period.

The reason why the zygote, or part of it, becomes implanted on the lower segment of the uterus is unknown. The few theories advanced have been found on critical examination to be unsatisfactory. The suggestion that subinvolution and chronic endometritis may be the principal factors is based on the belief of many that placenta prævia is far more common in multiparas than in primigravidas. In general, this belief is correct, but if some women who have borne 1, 2, or more children are considered, placenta prævia is far more frequent in primigravidas.

According to five-year periods, the greatest number of the women whose cases are reviewed were between thirty-one and thirty-five years of age and the next greatest number (only 33 fewer) were between twenty-six and thirty. The condition occurred most often in women thirty-two years of age and next most often in those thirty years of age.

Of 4,406 women, 886 (20.1 per cent) were primigravidas and 3,520 (79.9 per cent) multiparas.

Of 4,065 women, 2,808 (69.0 per cent) had been pregnant for 36 weeks or longer and 1,257 (30.9 per cent) for less than 36 weeks. The placenta prævia was diagnosed most often at term and next most often in the thirty-sixth week of pregnancy. As a rule the diagnosis is quite easy.

Cases of placenta prævia may be divided into 2 groups: (1) those in which the cervical canal is sufficiently patent to allow a finger to be passed through it; and (2) those in which the external os is closed so that a finger cannot be passed through it. In cases of the second group, in which the placenta is far more often of the complete variety, the slight expansion of the lower uterine segment is sufficient

to cause slight separation of the placenta but not sufficient to cause dilatation of the internal os permitting the passage of a finger. Therefore the diagnosis must remain uncertain for a time. Although there are certain signs suggesting the nature of the condition they are by no means absolute.

A certain amount of confusion has been caused by the description of the different varieties of placenta prævia by such adjectives as "central," "complete," "incomplete," "marginal," "partial," "lateral," and "high lateral." It has been caused also by rare cases in which bleeding occurs when the cervix is closed and rigid. Bleeding usually signifies dilatation of the lower uterine segment and cervical canal, and under such conditions the placenta can be felt. In most of the rare cases mentioned the placenta is central and the smallest amount of dilatation is able to separate it.

The author gives the following rules for treatment of placenta prævia:

1. Control the bleeding as soon as possible. The patient will never be safe until the child is delivered and the uterus is well retracted. There have been many maternal deaths from antepartum hemorrhage in cases without bleeding after delivery of the child and placenta. The method of choice to control the bleeding depends upon the variety of the placenta prævia. Packing of the vagina, though a poor method, is indicated when: (a) dangerous bleeding occurs before the patient can be removed to a hospital; (b) the condition of the patient is so serious that active treatment should not be employed until she has had a blood transfusion or an infusion of salt solution and glucose; (c) sudden severe bleeding follows a vaginal examination and the physician is unprepared to employ one of the methods of delivery at once. As a rule the packing is done very inefficiently, doubtless because of a lack of adequate illumination, proper material and instruments, and expert assistance. When it must be done because of dangerous bleeding or the distance of the patient's home from a hospital, the packing should be soaked in an antiseptic.

The importance of controlling the bleeding as soon as possible is evident from the mortality of postpartum hemorrhage. In cases of placenta prævia, postpartum hemorrhage is much more serious than in cases in which the implantation of the placenta is normal because, on account of the antepartum hemorrhage and the frequent deficient retraction of the uterus resulting therefrom, the loss of only a few ounces of blood will be sufficient to cause death whereas, when the implantation of the placenta is normal the loss of more than a pint is usually necessary for a fatal termination. Unless the patient is bleeding dangerously the delivery of the placenta should not be hurried. The separation should be allowed to occur naturally, and in the meantime measures should be taken to improve the patient's condition. Removal of the placenta manually because it has not separated in the usual time is fraught with great danger of infection and shock. It must be borne in mind that in cases of placenta prævia the lower uterine segment is friable and therefore easily torn during manipulations to deliver the child. There are reports of cases in which such an injury resulted in death from postpartum hemorrhage. If abnormal bleeding occurs after the third stage of labor, the cervix should be examined at once. In the reviewed cases, postpartum hemorrhage with shock was the second most common cause of death, being responsible for a mortality of 18.0 per cent. In 22.4 per cent of the cases of death due to this cause the condition of the patient at the time of her admission to the hospital was recorded as good.

2. Do not make a vaginal examination unless you are prepared to give appropriate treatment at once. A vaginal examination may easily separate an additional area of placenta or disturb blood clots, thereby increasing the bleeding to a serious degree before the patient can be sent to a hospital or expert assistance can be obtained. When the pregnancy is so far advanced that placenta prævia is suggested as the cause of bleeding, the patient should be taken to a hospital or a nursing home before a vaginal examination is made.

3. Combat shock if it is present. In the cases reviewed, shock was responsible for a mortality of 18.0 per cent although in 34.5 per cent of the cases with fatal shock the condition of the patient at the time of her admission to the hospital was recorded as good. If the hemorrhage has been controlled, severe shock and collapse are indications for delay of operative interference until some degree of recovery has been brought about by the treatment. If the hemoglobin, which can be easily and quickly estimated in the ward, is below 30 per cent, immediate blood transfusion is indicated. As both fluid and red cells are needed, from 500 to 600 c.cm. of blood should be given. When the anemia is less severe the transfusion of from 250 to 300 c.cm. of blood or the alternate intravenous infusion of saline solution and glucose is sufficient. When there is shock with low blood pressure, from 50 to 100 c. cm. of a 30 per cent hypertonic solution should be given. A systolic blood pressure below 100 mm. is a danger signal and an indication that operative interference should be delayed, if possible, until treatment can be given. Drugs appear to be of little value. Of those recommended, ephedrine, adrenalin, and coramine are most likely to relieve circulatory failure. Bandaging of the limbs, hot drinks, and the application of hot water bottles may also be beneficial. When a patient is suffering from shock at the time of her admission to the hospital the blood of the relatives who accompany her should be typed in case a blood transfusion is considered desirable then or should become desirable later. If any noteworthy bleeding occurs during the delay of operative treatment, the vagina should be packed, every care being taken to prevent septic infection.

4. Take every precaution to prevent septic infection. Septic infection is the most common cause

of death in placenta prævia. Because of the proximity of the placental site to the vagina and the necessity of touching it in many of the methods of delivery, and because of the inevitable bleeding which lowers the patient's resistance, this is not surprising. In the reviewed cases the mortality due to septic infection was 20.5 per cent. Nevertheless, in 63 per cent of the cases of death from that cause the condition of the patient at the time of her admission to the hospital was recorded as good. In the cases in which the vagina was packed, the mortality from sepsis was 23.5 per cent, and in those in which the placenta was removed manually it was 18.4 per cent.

5. Do not hasten delivery except in cases in which cesarean section is done. In some cases it may be advisable to delay even cesarean section until the patient's condition has improved. In 14.6 per cent of the reviewed cases in which this operation was followed by death the patient was admitted to the hospital in a state of collapse. Hastening delivery favors shock, postpartum hemorrhage, and tears of the cervix and lower uterine segment, and increases the risk of sepsis and the risk to the child. So long as there is no dangerous bleeding the labor should be allowed to progress normally. In the meanwhile measures should be taken to improve the patient's condition. When labor is slow, the open vessels in the placental site are given a better opportunity to become thrombosed and the uterus a better opportunity to regain or increase its retractile power. The lower segment of the uterus is especially liable to injury in cases of placenta prævia. Exceptions to Herman's aphorism "slow extraction and antisepsis" are cases in which, a bag having been inserted and later expelled, the release of pressure on the placental site results in the onset of dangerous bleeding.

6. Perforate the placenta, if its perforation is necessary, with a sharp-pointed instrument. The best treatment of a patient whose os is completely covered with placenta appears to be quite obvious except when her surroundings and the lack of expert assistance contra-indicate cesarean section. As a rule, perforation of the placenta will not be necessary, but when it is required, a sharp-pointed instrument should be used as otherwise the placenta may be further separated and furious hemorrhage may result.

7. Whenever possible treat the patient in a hospital or a nursing home as it is never known when her condition may suddenly become worse. In such surroundings the danger of infection is decreased and all the appliances that may be required are at hand. J. THORNWELL WITHERSPOON, M.D.

Henry, J. S.: The Effect of Pregnancy upon the Blood Pressure. *J. Obst. & Gynæc. Brit. Emp.*, 1936, 43: 908.

After reviewing the principal publications of the last thirty-five years on the effect of pregnancy upon the blood pressure, the author reports a study of the blood pressure of 618 women with apparently normal pregnancies and 284 women suffering from various toxemias of pregnancy. From his findings he draws the following conclusions:

1. There is no rise in the systolic or diastolic blood pressure during normal pregnancy.

2. There is a marked fall in the diastolic pressure and a rise in the pulse pressure in normal pregnancy, and some evidence for the belief that the systolic pressure is lower than in the non-pregnant state.

3. The toxemias of pregnancy, pre-eclampsia, and eclampsia do not appear suddenly in the last few weeks of pregnancy. On the contrary, they give warning of their development for days, weeks, or even months by an elevation and irregularity in the blood pressure. Frequently these changes are recognizable in the first trimester. In the later and more severe course of the toxemias a disproportionately high diastolic pressure and an abnormally low pulse pressure appear to be definitely proved.

4. Any rise in the blood pressure during pregnancy is of pathologic origin and is evidence of some degree of toxemia.

5. In normal pregnancy the decrease in the blood pressure and the increase in the pulse pressure, together with a probable decrease in the viscosity of the blood, constitute a mechanism by which the heart is enabled to meet the increased demands made upon it by the increase in the blood volume and vascular area without going beyond the limits of its reserve. STANLEY C. HALL, M.D.

LABOR AND ITS COMPLICATIONS

Wrigley, A. J., Roques, F., Walker, A., Spencer, H., and Others. On the Motion: "That Induction of Premature Labor Should Not Play Any Part in the Treatment of Pelvic Contraction or Disproportion in Primigravidæ." *Proc. Roy. Soc. Med.*, Lond., 1936, 29: 1473.

WRIGLEY stated that in his opinion the surgical induction of premature labor in the cases of primigravidas is unjustifiable because: (1) it is impossible to estimate the fit of the fetal head into the pelvis; (2) the procedure has resulted in an increase in fetal and maternal mortality and in maternal morbidity; (3) induced labor is frequently complicated by imperfect uterine action with its accompanying dangers; (4) surgical means may fail to induce labor, thereby causing more dangerous complications; and (5) he has obtained better results by other means.

ROQUES said that he favored an expectant attitude because no obstetrician can foretell with any degree of accuracy before labor has begun how it will progress since the mode of action of the factors concerned in engagement or non-engagement of the head is variable.

WALKER discussed trial labor. He said that he regarded it, not as a battle between the fetal skull and the bony pelvis, in which it is hoped the skull will collapse before the uterus gives out, but as the provision of an opportunity for a deflexed head or a

conical lower uterine segment to re-adjust itself and for the increasing tension on the cardinal ligaments to pull down the uterus and its contents. When time has been given for this re-adjustment to take place, the position can be reviewed afresh.

SPENCER said that induction of labor in cases of minor contraction or disproportion and cesarean section in cases of more marked contraction and disproportion reduce the frequency of forceps delivery with its well-known dangers to mother and child, render craniotomy on the living child unnecessary except when there is hydrocephalus, and have a low total maternal and fetal death rate. Induction is safer for the mother than the use of forceps or cesarean section. Although the associated infant mortality is about 12 per cent, infants born after the thirty-fifth week of pregnancy, counting from the last day of the last period, grow up into strong and healthy men and women.

WYATT stated that there are 2 variable factors in all labors: (1) the strength and frequency of the pains, and (2) the size of the fetus. If the pains are weak, the first stage will be prolonged and the patient will be so tired that when her voluntary efforts, which are so valuable in the second stage, are needed they will not be sufficient to help mould the head through the pelvis. The size of the fetus, whose weight at full term may be as high as 10 lb., may make normal delivery through a small pelvis impossible. If it were possible to limit the weight of the infant at birth to 7 lb., maternal morbidity and mortality would be considerably decreased.

WILLIAMS stated that the use of the x-rays in obstetrics has shown that fetal deflexion is physiological until the forces of labor set in to promote flexion. Exclusive of the pelvis of the Goldthwait asthenic physical type, rickets, certain other bone diseases, and the large post-mature over-ossified fetal skull, disproportion at the brim is the rarest cause of the floating head, contrary to statements frequently made in standard textbooks.

LUKER said that the induction of premature labor in cases of contracted pelvis or disproportion in primigravidas originated in Britain and has been practised by British obstetricians ever since. The general indications are slight or moderate degrees of pelvic contraction in which the true conjugate is estimated at not less than 3½ in. The fetus should be not more than 4 weeks premature. In the period from the thirty-sixth week to full term the strength of the child increases, but as the head also becomes harder, induction must not be too long delayed. The correct time for it can be estimated with considerable accuracy if the patient is examined at frequent intervals toward the end of pregnancy. The examination should include measurement of the umbilical girth and the height of the fundus uteri, and thorough palpation to determine the size of the fetus. When it is found that the fetal head cannot quite be pushed into the brim of the pelvis by abdominal manipulation, an examination should be made by the bimanual method, if necessary under anesthesia. The level of the most advanced part of the fetal head with reference to the lower margin of the symphysis pubis will supply information of value. The character of labor following induction by bougies is not different from that of an ordinary labor. Because of the softness of the fetal head, the use of forceps should be avoided if possible, and as the fetus will not be so strong as a full-time child, prolonged or deep chloroform anesthesia is contraindicated. In the cases of women of the middle and upper classes, the economic factor must be taken into consideration. These classes are limiting their families because of the cost of confinement and the rearing of children. They find it difficult to pay for the advantages of nursing-home treatment. If a test labor is to be carried out, the woman must go to a nursing-home, and if delivery is effected by cesarean section, considerable extra expense is incurred and will be repeated at future confinements. Therefore it seems reasonable to assume that if test labors and cesarean sections are practised to the exclusion of the induction of premature labor the birth rate in the upper and middle classes will be reduced even lower than it is at the present time.

NORMAN said that he spoke on the basis of many years' experience in maternity work as a general practitioner. In spite of the dangers and the terrors which had been portrayed as associated with the induction of labor, he still favors the procedure. Its merits must be judged from its results as compared with those of cesarean section. During his experience of 30 years Norman had had several cases in which cesarean section prevented the woman from having more children. He regards the induction of labor as perfectly safe. He has carried it out both in private practice and in institutions, and had had no poor results. In no case did pyrexia develop.

THEOBALD stated that he believed it is possible to form a very accurate opinion as to whether the head can pass through the pelvis, and that the "pains" can be increased by the exhibition of such drugs as quinine, morphine, and scopolamine. He has given up trial labor because of the risk of sepsis although he believes that it may be of advantage in a small number of cases. In his opinion the most common cause for the head's remaining above the brim until after the onset of labor is increased inclination of the pelvic brim. This can be demonstrated and the course of labor prognosticated. In conclusion he stated that the proper time to take steps to avoid operative interference is at the beginning of the first stage of labor.

KERR said that it is impossible in the thirty-sixth week of pregnancy to tell whether, in borderline cases, the head will pass through the passage or not. Neither is it possible to determine beforehand, even by roentgenographic pelvimetry and cephalometry, how the head is going to mould in labor or to foretell the strength of the uterine contractions. These very important uncertainties arise in all cases. It is only when labor is in progress that it is possible to prognosticate, with any degree of certainty, whether the

head will pass through the pelvis or not. Obviously, therefore, in the cases of primigravidas the only possible course is to allow the patient to go into labor, estimate the disproportion, and then decide for trial labor or cesarean section.

INCE stated that he is convinced that induction of labor has a very definite, if limited, place in the delivery of women with minor degrees of contracted pelvis and disproportion. He bases his opinion on the following facts:

1. The maternal morbidity of induction of labor is only 0.1 per cent higher than that of trial labor.
2. The fetal mortality is only 1.4 per cent higher than that of trial labor.
3. Trial labor is of no more value in deciding the conduct of labor in a second pregnancy than induction of labor. Every pregnancy must be regarded afresh from this standpoint, no matter how the first labor was ended.
4. The length of time required for recovery is much longer after abdominal delivery than after vaginal delivery, and the information gained from an abdominal delivery is of little value in the conduct of the next labor.
5. The fetal mortality of abdominal section following trial labor is so high that the decision to deliver abdominally must be made very early in labor and therefore cesarean section may be done in cases without absolute disproportion.

BOURNE reported that he had not induced labor on account of so-called disproportion since the visit, in 1923, of Williams, who had said that he never did so. He stated that in this discussion too much stress had been laid on the weight of the baby. Induction of labor is carried out in order to obtain a smaller head. He had made measurements and had obtained measurements by others of a large number of babies' heads. Assuming the shape of the presenting head to be a sphere, the average reduction in the presenting diameter obtained by induction in the thirty-sixth week is not more than ⅓ in. He therefore doubts whether it is worth while to induce labor for such a comparatively small reduction in size.

GUNN said that a cesarean section rate of less than 0.5 per cent does not suggest that it has been increased by refusing altogether to perform surgical induction for disproportion in primigravidas.

WINTERTON reported that at the Middlesex Hospital during the last 10 years there have been 44 cases in which laobr was induced because of disproportion in primigravidas. The method used was the insertion of a soft rubber bougie. The average length of the first stage of labor was 28 hours. The incidence of the use of forceps, which should be low on premature babies, was 18 per cent. In half of the cases in which forceps were used they were employed on account of signs of fetal distress. Sepsis occurred in 15 per cent of the cases, and in half of these it followed forceps delivery. The still-birth rate was 13 per cent, which is much too high. Half of the stillborn babies were delivered with forceps. Unfortunately there were very few postmortem reports. In 13 per cent of the cases the woman was obliged to remain in the hospital longer than the usual time on account of difficulty in feeding the baby and failure of the child to gain weight.

MCILROY advocated non-interference with pregnancy in cases of pelvic contraction and disproportion. She stated that she had almost entirely given up induction in these cases, not because of poor results, but because, if the woman is left alone, she gets along as well as, if not better than, she would without surgical interference. When once surgical induction had been carried out, the bolt has, so to speak, been shot, and further interference by forceps or cesarean section is fraught with the danger of injury or sepsis. This is one of her chief reasons for abandoning induction. She believes that too much stress had been laid upon the size of the bony pelvis and uterine forces. The pelvic ligaments must also be considered, as the progress of an easy labor depends to a certain extent upon the degree of elasticity of the ligaments which unite the pelvic bones. No estimate of these can be made from pelvic measurements. The mobility of the pubic arch can be estimated by examining the patient in the standing position with 2 fingers placed under the arch and the patient directed to raise first one foot and then the other. The movements of the pubic bones are a fair indication of the mobility of the joint and its power of expansion. McIlroy stated that if surgical induction is to be abandoned, something else must be substituted for it. Pelvic joints and tissues can be softened to a considerable extent by daily hot sitz baths during the 2 or 3 weeks just preceding term, and rigidity of the birth canal reduced by the administration of 15 gr. of chloral hydrate every night for a week before labor is due.

GILLIATT said that no trial can be called a trial labor until the membranes have ruptured.

ALLEN cited a case which showed how impossible it is to estimate the fit of the head into the pelvis. He had recommended a patient from an antenatal clinic for cesarean section. His findings were checked by others, and it was agreed that the operation should be performed. On the way to the operating room the nurse said that the head was well in the pelvis. The woman was delivered without even the use of forceps.

ROQUES strongly condemned the practice of subjecting a patient to cesarean section after failure of an attempt to induce labor by surgical means. He cited Kerr's statement that this is the most dangerous procedure in obstetrics. In answer to Gilliatt, he said that Walker's definition of trial of labor was incomplete. The trial cannot be said to have ended until after the membranes have ruptured.

J. THORNWELL WITHERSPOON, M.D.

Hanson, S.: The Transversely Contracted Midpelvis, with Particular Reference to Forceps Delivery. *Am. J. Obst. & Gynec.*, 1936, 32: 385.

The clinical significance of the transverse diameter of the narrow pelvic plane, as represented by the

bispinous diameter, was studied in a series of 3,941 consecutive women, 1,290 of whom were primiparas. The observations made may be summarized as follows:

In a high percentage of cases the transversely contracted narrow pelvic plane is associated with a persistent occiput-posterior position. This association and the resulting dystocia may be regarded as a syndrome. In the cases of a relatively large percentage of primiparas with transverse contraction of the lower midpelvis operative intervention is necessary. Of 207 such cases, midforceps delivery was necessary in 35 (16.6 per cent), whereas of 1,082 cases in which the transverse diameter was not contracted it was necessary in only 26 (2.4 per cent). Great resistance to instrumental rotation is frequently encountered in pelves with even a minor transverse contraction of the narrow plane (a bispinous diameter of from 9.5 to 9.0 cm.). However, in pelves with this degree of contraction resistance to traction is rare provided there is no malposition. In pelves with a major transverse contraction of the narrow plane (a bispinous diameter of 9.0 cm. or less), insuperable resistance to forceps traction is often encountered even after correction of malposition. The resistance to rotation and traction in pelves with a transversely contracted narrow plane is probably due in large measure to persistence of deflexion incident to forceps traction rather than to an absolute or pre-existent disproportion. Another probable cause of disproportion in these cases is encroachment of the blades of the forceps on the midpelvic space.

From the observations recorded it is tentatively concluded that high midforceps delivery is usually contra-indicated when there is a major transverse contraction of the narrow pelvic plane, and that instrumental rotation is usually contra-indicated when there is transverse contraction of even a minor degree.

A new dimension of the pelvis, the interischial diameter is described. This is the distance between the superior rami of the ischia at points immediately superior to the bases of the ischial spines.

Hanson classifies transversely contracted pelves into 3 groups: funnel pelves, simple justo minor pelves, and flat justo minor pelves.

EDWARD L. CORNELL, M.D.

PUERPERIUM AND ITS COMPLICATIONS

Tesauro G.: A Contribution to the Study of Rupture of the Uterus (Contributo allo studio delle rotture dell'utero). *Arch. di ostet. e ginec.*, 1936, 43: 319.

The author reports 30 cases of rupture of the uterus in which he operated in a period of six years. Twenty-eight of these occurred in 9,340 cases of delivery at the Obstetrical-Gynecological Clinic of the Royal University of Naples (an incidence of 0.3 per cent) and 2 in 212 cases of delivery on the maternity service of the Salerno Hospital (an incidence of 2.35 per cent). In addition, Tesauro discusses briefly 18 cases of threatened rupture of the uterus.

Four (13.3 per cent) of the 30 women with rupture of the uterus were primiparas and 26 had had from 2 to 14 pregnancies. Thirteen (63 per cent) were over thirty-five years of age. Fifteen of the ruptures were due to traumatic (postoperative) causes and 15 were spontaneous. Of the latter, 1 occurred through the scar of a myomectomy, 4 were caused by impacted shoulder presentations, 2 were due to pelvic stenosis, 1 was associated with a face presentation, and 6 were the result of miscellaneous causes in cases in which the fetus was in vertex presentation and the pelvis normal.

In the majority of the cases there was a history of preceding puerperal infection, an obstetrical operation, or inflammatory processes, or a scar was present.

In 23 of the cases the rupture was complete. In 1 of these it was limited to the fundus and in 22 it occurred through the lower uterine segment. In 7, it was subperitoneal (lower segment).

The most frequent site of rupture was in the left anterior surface of the lower segment of the uterus. In 1 case the rupture extended into the bladder, and in another it was vesicovaginal.

In 29 cases subtotal hysterectomy was performed. In 1 case only simple drainage of the ruptured subperitoneal site was necessary. Following hysterectomy, abdominal closure without drainage was done only once. In 3 cases abdominal drainage with Mikulicz drains and in 23 cases combined vaginoabdominal drainage was established.

Two patients died during the operative intervention, 6 died of sepsis or pulmonary complications on the third to fifth day after the operation, and 1 died of multiple emboli on the twenty-fifth day. The total mortality was 30 per cent, but if the cases of death during operation and the case of simple drainage of the ruptured subperitoneal site are subtracted it is reduced to 25.9 per cent.

The author attributes the high incidence of cure (74.08 per cent) to the use of combined vaginoabdominal drainage in the majority of the cases.

GEORGE C. FINOLA, M.D.

Steinkamm, E.: Treatment of Puerperal Mastitis by Weak Roentgen Irradiation (Behandlung der puerperalen Mastitis mit Roentgenschwachbestrahlung). *Zentralbl. f. Gynaek.*, 1936, p. 103.

The author reports 47 cases of puerperal mastitis which were treated by weak roentgen irradiation and compares the results with those in 40 cases treated by the usual conservative measures (high bandaging and emptying of the breast, and the application of alcohol compresses).

Of the 47 cases treated by irradiation, incision was necessary in 12, whereas of the 40 cases treated by other procedures, it was necessary in 14. However, the high incidence of incision in the former group is explained by the fact that the irradiation could

not be given early in all of the cases. As a rule abscess formation can be prevented only when the irradiation is given at the first appearance of the inflammation. Of 34 cases treated by irradiation early, 32 (94 per cent) were cured and small puncture incisions were necessary in only 2, whereas of the 40 cases treated by other measures, only 26 (65 per cent) were cured and large incisions were necessary in 14.

The average dose of roentgen irradiation was 78 r, about 10 per cent of the skin-erythema dose. After the irradiation, high bandaging of the breast was done, and if there was pain, the milk was pumped out. Beginning 24 hours later, at the earliest, compresses were applied until the redness disappeared and the pain ceased. No roentgen injuries of any kind were observed.

In conclusion the author states that the described treatment is of value not only because of its superior results, but also because it prevents or shortens the period of illness by accelerating the abscess formation and is an ambulatory treatment of low cost.

(Karl Koch). Louis Neuwelt, M.D.

Colebrook, L.: The Prevention of Puerperal Sepsis. *J. Obst. & Gynæc. Brit. Emp.*, 1936, 43: 691.

Colebrook divides puerperal infections into the following 2 groups:

1. Those which are intimately associated in their origin with injury to the maternal tissues during the process of childbirth. The bacterial infections which complicate recovery from these injuries vary greatly in character. The hemolytic streptococcus is by no means always associated with such injuries —probably is not present in half of them—but when it is present the clinical picture is especially alarming. Colebrook believes it is impossible to regard the hemolytic streptococcus as a sharply defined variety or species. He states that the ability to hemolyze red blood cells is a property shared to greater or less degree by several groups of streptococci. Only 1 of these groups is commonly responsible for severe infections in man. Others are responsible for certain infections in animals, e.g., mastitis in cows and strangles in horses. A third group are non-pathogenic so far as is known.

2. Those which occur in cases in which labor was accompanied by little or no trauma and are due to the entrance of the hemolytic streptococcus into the genital tract of the mother.

It is known that hemolytic streptococci of the kind causing puerperal fever are present in a great variety of common septic conditions such as tonsillitis, scarlet fever, otitis media, mastoid disease, erysipelas, nasal sinus infection, wound infections of all kinds, burns, whitlows, finger infections, and impetigo. Moreover, symptoms more or less closely resembling those of the common cold or so-called influenza may sometimes be associated with streptococcal infection, and persons without apparent signs of definite infection sometimes harbor hemolytic streptococci in the throat or nose. Recently Colebrook has discovered that the air is a potential source of infection.

With regard to the prevention of puerperal infection he draws the following conclusions:

1. The hemolytic streptococci of the respiratory tract, particularly those associated with recent acute infections, constitute the chief menace in maternity work.

2. The healthy carrier is less to be feared than the individual with an acute infection.

3. The danger of invasion by the hemolytic streptococci threatens the parturient woman, not from one direction but from many.

With regard to the prevention and recognition of infection by the hemolytic streptococci, he makes the following statements:

1. Arrangements should be made in advance for the prompt detection of catarrhal and inflammatory conditions of the respiratory tract due to the hemolytic streptococci in the obstetrical personnel before they have caused puerperal infection or disseminated the streptococci.

2. Puerperal infection by the hemolytic streptococcus should be recognized immediately and a likely source of the bacteria in attendants detected.

3. Arrangements should be made for the prompt removal of every infectious case from maternity institutions unless they are provided with an entirely separate septic block with a separately housed nursing staff.

4. Provision should be made against infection of the mother from her own nose or throat or from a member of her household.

5. Some organization of bacteriological services should be arranged in order that the swabs may be dealt with promptly, cheaply, and uniformly.

6. Delivery should not take place in an environment which is likely to be infested with streptococci.

7. A streptococcus-infested environment is not likely to be present in institutions.

8. The present system whereby maternity work is conducted by district nurses who are responsible also for the dressing of wounds and attendance upon all sorts of infective cases should be abandoned and all those engaged in midwifery should receive better instruction as to the principal sources of puerperal infection and the sound principles of antisepsis.

In discussing the conduct of labor Colebrook stresses the importance of the wearing of a mask. He states that because of the possibility of airborne infection and the multiplicity of the sources of infection a single act of disinfection is not sufficient for maximum safety and a lasting antiseptic barrier, particularly on the hands and the vulva, is essential. He believes that thorough washing with soap and water is perhaps the most important item in the antiseptic technique. This should be followed by the use of an antiseptic. He recommends the use of dettol, the chief active agent of which is chlor xylenol. He suggests also disinfecting the hands of the patient with the disinfectant.

Albert M. Vollmer, M.D.

NEWBORN

Scaglietti O.: Obstetrical Lesions of the Shoulder (Lesioni ostetriche della spalla). *Chir. d. organi di movimento*, 1936, 22: 183.

The author reports a study of 199 obstetrical injuries of the shoulder collected at the Rizzoli Institute in the period from 1899 to June, 1935. Among these he was able to distinguish 3 distinct types of lesions: an articular type, which occurred in 62 cases; a paralytic type, which occurred in 22; and a mixed articular-paralytic type, which occurred in 14. There were 101 old or latent cases which could not be classified because the clinical and roentgenographic data were insufficient.

The articular types of lesion Scaglietti divides into: (1) simple distortion, and (2) detachment of the epiphysis. In both the early symptoms are pain on motion, joint tenderness, and immobility of the arm, and the early x-ray findings are absolutely negative. An accurate diagnosis cannot be made until callus formation, which occurs only in the latter, takes place. As ossification of the upper end of the humerus occurs at about the third month after birth the diagnosis is sometimes delayed for a considerable time.

The treatment indicated for simple distortion is immobilization and proper support in abduction. For detachment of the epiphysis the author has found the capsulotomy of Sever combined with the derotative osteotomy of Putti the best procedure.

In obstetrical paralysis due to injury of the brachial plexus the symptoms are the usual ones of characteristic position and flaccidity of the arm. The diagnosis is easily made by neurological examination and electrical conduction tests. The treatment indicated is the same as that for simple articular injuries of the shoulder, supplemented by massage and electrical stimulation. The author believes that nerve suture, when employed, should not be delayed more than six months after the injury.

Ninety-one and six-tenths per cent of the reviewed obstetrical lesions of the shoulder occurred in cases of dystocia. In 75.5 per cent of these cases some form of obstetrical intervention was required. Thirty-eight and seven-tenths per cent of the injuries occurred in cases of breech presentation and 13.75 per cent in cases of shoulder presentation.

The lesions were more frequent in males than in females, more frequently unilateral (93.4 per cent of the cases) than bilateral (6.5 per cent), and more frequent on the right side (62.8 per cent) than on the left (30.6 per cent).

The author believes that the lesions are always produced during the process of delivery, and that their severity varies directly with the degree of violence employed.

In a follow-up of infants with the simple articular type of injury it was found that only 1 out of 9 had any deformity. The results in cases of complicated shoulder injuries were also said to be good. In the cases of obstetrical paralysis, minor injuries responded well to treatment, but in 8 cases of nerve suture the results in general were unsatisfactory.

GEORGE C. FINOLA. M.D

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Costa A., and Severi, L.: The Histology and Physiopathological Significance of the Venous System of the Suprarenal Glands (Istologia e significato fisiopatologico del sistema venoso delle capsule surrenali). *Sperimentale*, 1936, 90: 321.

Costa and Severi made a histological study of 120 suprarenal glands which were taken from individuals of various ages and of both sexes who had died of various diseases and from 20 fetuses whose ages ranged from 7 to 9 months of intra-uterine life.

They found that in the venous system of the suprarenal gland there may be distinguished: (1) veins with a connective tissue wall (sinusoids, small central veins); (2) veins with a circularly arranged muscular coat (veins with dense muscle bundles, veins with non-protruding muscle bundles, small veins with pillars, large veins with pillars); and (3) veins with a continuous muscular wall (suprarenal veins). The large veins with pillars have a partly muscular and partly capillary wall and may therefore be also called "hemiveins."

As the suprarenal vein is traced distally, there is a gradual reduction of the longitudinal muscular pillars which become more and more separated from the intima until, in certain segments, they come to lie outside of the vascular wall (veins with dense bundles). In the more distal segments the musculature disappears (veins with a connective tissue wall, sinusoids).

The radicles of the large veins with pillars are veins with non-protruding muscle bundles. Collaterally they receive only the sinusoids which empty in part through the muscular pillars and in part into the segments opposite them.

The longitudinal muscular layer of the venous system of the suprarenal veins has probably a propelling and a stenosing function, the former emptying the veins with pillars and their radicles and the latter affecting the sinusoids which open laterally through the muscular pillars. It is probable that this muscular system of propulsion has the function of responding to sudden demands by the organism for blood rich in adrenalin. Very little blood may be left in the adrenal gland after sudden expulsion, but the system is so regulated that some of the efferent canals are closed.

The muscular pillars are not developed until the end of childhood. They are absent in fetal life and during the first few years of extra-uterine life. Therefore hematomas of the suprarenal gland in the newborn are due more to the blood stasis caused by mechanical factors incident to parturition than to direct traumatic action. Hence there occurs a rupture of the blood spaces in the medulla which are not yet completely developed and lack a propelling muscular tissue. It is possible also that in certain hematomas of the suprarenal glands in the adult (specifically, those of toxic, traumatic, or obscure origin) there occurs, as the result of violent vasomotor phenomena caused by trauma or a toxic agent, a spasm of the musculature of the hemiveins with consequent ectasia and rupture of the capillary portion of the wall. RICHARD E. SOMMA, M.D.

Bouchard-Potocki, R.: Rules to be Observed in the Practice of Pyelography (Les règles à observer dans la pratique de la pyélographie). *J. d'urol. méd. et chir.*, 1936, 42: 143.

Bouchard-Potocki emphasizes the value of pyelography to the urologist in the solution of certain clinical problems that, without it, would remain unsolved. To obtain the best results from this examination certain rules must be observed.

1. Bilateral pyelography must be done as a routine procedure. Very often patients come to the urologist with pain in the lumbar region definitely localized to one side when the renal lesion is on the opposite side. In cases of renal or ureteral calculus this is sometimes demonstrated by the plain roentgenogram which shows the calculus or calculi on the side opposite the side of the pain. In cases of lesions which can be demonstrated only by pyelography, bilateral pyelography is necessary to determine the nature and location of the lesion.

In the early days, pyelography was carried out with opaque media such as collargol which were evacuated with difficulty from a distended pelvis and might even cause obstruction of the renal tubules if forced into the renal parenchyma with too great pressure. Under these conditions it is not surprising that urologists hesitated to inject such a solution into both pelves at the same time. Later, the use of sodium bromide as the opaque medium was an improvement, but as even this was often irritating to the mucosa of the urinary tract, pyelography was usually done on only one side at a time. In the last few years the development and use of opaque media which are well tolerated by the organism even if injected into the veins (uroselectan, abrodyl, and tenebryl) has removed this objection to bilateral pyelography. Only bilateral pyelography can show the condition in both kidneys. This is true especially in hydronephrosis. Since using this method the author has found that hydronephrosis is more apt to be bilateral than unilateral. He reports 3 cases showing the value of bilateral pyelography—2 cases of bilateral hydronephrosis and 1 case of polycystic kidney on one side and ptosis of the kidney with beginning dilatation of the renal pelvis on the other side.

2. Pyelography should be done with the patient in the erect as well as the recumbent position. This

is possible by the use of special tables by which the patient may be raised from the prone position by the simple turn of a screw. The 2 pyelograms can be made within a few seconds. This procedure is necessary particularly for the correct diagnosis of ptosis of the kidney, which is not always demonstrated by the pyelogram in the prone position alone.

3. Pyelography should include demonstration of the ureters, i.e., should be a ureteropyelography. For this purpose a catheter should be used with an olive tip introduced just beyond the ureteral orifice and obstructing it. The opaque medium will then show the ureter as well as the renal pelvis and its calyces. Dilatations, strictures, and abnormalities of the ureter are demonstrated at the same time as renal lesions. The author reports an illustrative case in which a duplication of the renal pelvis and ureter on the right side was demonstrated by this method.

The author states that intravenous urography meets these 3 requirements for successful pyelography and has the added advantage of not requiring instrumentation of the urinary tract. However, the findings with intravenous urography are sometimes deceiving or lacking in precision. The urogram does not give so clear a picture of the renal pelvis and the ureters as the pyelogram. However, intravenous urography has a definite value, especially in cases with vesical lesions which make instrumentation impossible. It often shows renal anomalies, and it may be used for preliminary examination to determine the region to be explored. The author believes that intravenous urography is to be regarded as a supplement to, rather than as a substitute for, pyelography. He is convinced that pyelography is the most certain and satisfactory method for the demonstration of pathologic conditions in the kidneys and ureters. ALICE M. MEYERS.

Cabot, H.: Blood-Stream Infections of the Kidney. *Brit. J. Urol.*, 1936, 8: 233.

Blood-stream infection of the kidney is less understood than the so-called ascending type of renal infection. Bacteria reaching the kidney through the blood stream may produce lesions which are readily recognized in their advanced stages, but may be overlooked in their less well-defined phases. The pus-producing cocci produce widespread miliary abscesses, massive abscess or carbuncle, and perinephritic abscess. The bacilli, chiefly varieties of colon bacilli, produce transitory infections or lesions commonly classified as types of pyelitis. Cabot discusses chiefly the lesions caused by the pus-producing cocci.

These lesions are commonly secondary to suppurative peripheral lesions. The cocci may reach the circulation and finally the kidney from lesions of the upper respiratory passages, particularly the throat and nasopharynx. The author called attention to the frequency of this source of infection several years ago. He is convinced that the bacteria not only reach the circulation and the kidney, but also appear in the urine. By appropriate methods of examination the presence of a mild lesion of the kidney can be established in cases of such infections in which the temperature fails to return to normal. In the cases of 46 patients with acute inflammatory lesions or wounds about the face, neck, and throat, specimens of urine which were apparently normal to ordinary study were centrifugalized and the sediment was stained by Gram's method and cultured. In 32 cases bacteria were found in the smear and in 18 of the same group the presence of pathogenic organisms was demonstrated by culture. Of 10 controls, the smears were negative in all and the cultures were positive in 2. This suggests that the bacteria were producing a lesion of the kidney by which they were being passed into the urine, although no lesion of the kidney was identifiable as such. Further study showed that the presence of pus-producing cocci in the urine is limited to the early days of the disease. During the first four days after the onset of mild renal pain and costomuscular tenderness the pus-producing cocci can be regularly identified in the urine by the described method. Prolonged centrifugalization is essential. Repeated smears are perhaps of more value than cultures. The late and more severe types of lesions are the ones seen by the surgeon and pathologist. It is not necessary to assume that clumps or emboli of staphylococci produce the lesions. Septic infarction of the kidney is uncommon. Old adhesive perinephritis is a frequent finding. Massive abscesses of the kidney may be truly embolic. The author believes that the intimate relations between blood-stream infections by pus-producing cocci, multiple or massive abscess of the kidney, perinephritis, and perinephritic abscess are important and should be understood.

Cabot distinguishes 4 types of cases of blood-stream infection of the kidney: (1) the fulminating cases, in which a search for cocci in the urine is important because the diagnosis is difficult; (2) the acute cases, which present the least difficulty in diagnosis; (3) the subacute cases, in which the demonstration of cocci in the urine will clear a doubtful diagnosis; and (4) borderline cases, in which only the finding of the cocci will assure the diagnosis.

Attention is called to the roentgen findings of diagnostic aid. In perinephritic abscess, these are clouding or absence of the psoas shadow and scoliosis of the spine with the convexity away from the diseased side; and in massive abscess or perinephritic abscess, limitation of the movement of the inner portion of the diaphragm. The limitation of mobility of the kidney can be shown by intravenous urograms in the Trendelenburg and vertical positions. Pyelograms are of value in the analysis of these lesions.

The treatment of the various types of lesions is discussed. To determine the appropriate treatment a careful study by all methods is necessary. The author believes that in about half the cases armed watchfulness is best. He regards operation as indicated when it is evident that the patient is not controlling the infection. He questions the efficacy of vaccine therapy. He states that in fulminating

infections nephrectomy should be done as early as possible.

He does not see any particular advantage in urinary antiseptics given by mouth or in antiseptic solutions given by vein. However, he regards neoarsphenamine as of value in chronic ascending types of infection. He believes that operation is indicated: (1) when the patient cannot combat the disease; (2) in massive abscess; (3) in perinephritic abscess; and (4) in fulminating infection. He discusses operative methods for the different types of lesions.

GILBERT J. THOMAS, M.D.

Marion: The Evolution of the Kidneys Following the Removal of Calculi from the Kidney, the Renal Pelvis, or the Ureter (De l'évolution des reins après l'ablation des calculs du rein, du bassinet ou de l'uretère). *J. d'urol. méd. et chir.*, 1936, 42: 193.

Marion has observed that following the removal of stones from the kidney, renal pelvis, or ureter, complications of 3 types may arise even in the absence of a pre-existing pyorenal infection.

In certain cases a pre-existing infection may continue to develop under various influences. The kidney loses its normal function, manifestations of a pyonephrosis appear a few years later, and ultimately nephrectomy may become necessary. Marion has observed 2 cases in which, following the removal of renal stones, the kidneys became transformed into large pyonephrotic pockets. Nephrectomy was performed in both.

In another percentage of cases the removal of renal stones is followed by progressive sclerosis of the kidney. The organ becomes atrophic and distorted, and the appearance of the renal pelvis and the calyces in the roentgenograms is atypical. The author reports 3 cases with complications of this type. In one of them severe pain developed postoperatively in the region of the involved kidney. Subsequent clinical examination revealed a disturbance of the functional capacity of the kidney. The pyelograms showed a completely altered picture of the renal pelvis and the calyces. On gross examination after nephrectomy the kidney was found completely sclerosed and atrophied. Marion believes that in this case the renal infection had continued to progress in an attenuated form.

In cases of ureteral stone the lumen of the ureter may become completely obliterated. In a case observed by the author the patient had had several attacks of renal colic during one of which the lumen of the ureter became obliterated. The obliteration led to extensive atrophy of the corresponding kidney. In another case, a few weeks following nephrotomy for ureteral stone, the lumen of the ureter became completely obliterated at the site where the stone had lodged. The author attempted to re-establish the continuity of the ureter, but failed because of the presence of a severe periureteritis.

From these observations Marion concludes that the removal of renal and ureteral stones calls for a reserved prognosis because complications such as pyonephrosis, renal sclerosis, and ureteral obliteration may arise. Such accidents are serious as they may result in complete destruction of the kidney.

RICHARD E. SOMMA, M.D.

Serrallach, N., Serrallach-Julia, F., Jr., and Amell y Sans, A.: Biological Methods of Compensation in Ureteral Obstruction (Sur les mesures biologiques de compensation dans les obstructions urétérales). *J. d'urol. méd. et chir.*, 1936, 42: 5; 166.

It is recognized today that urinary retention in the renal pelvis and ureter is the *primum movens* of almost all pathologic changes in the upper urinary tract. The organism uses all its resources to combat the consequences of such obstruction. Descending pyelography has shown that when there is complete obstruction of a ureter, the kidney does not secrete for several days, but if the obstruction is relieved the kidney becomes functionally active again. The investigations of Bazy, Tuffier, and others have shown that uronephroses are soon transformed into hydronephroses; that retained urine loses its chemical characteristics and becomes like blood serum as the result of osmotic exchange. This is a process which prolongs the life of the kidney because it eliminates certain toxic elements from the retained urine. It is well known that if the ureter is sectioned accidentally or intentionally in the course of an abdominal operation, the patient does not have pain, fever, or symptoms of uremia such as result from urinary retention due to obstruction of the ureter by a calculus, stricture, or clot. While theoretically the 2 processes are identical in that both result in stagnation of urine in the upper urinary tract, the reaction of the organism is entirely different.

The authors carried out experiments on guinea pigs and rabbits to determine the processes of "compensation" that protect the kidney against injuries resulting from urinary retention in the renal pelvis and the ureter. One or both ureters were ligated under local anesthesia and the retained urine obtained by puncture and studied at various intervals. In several experiments the ureter was filled with uroselectan after the urine was drained off and studied roentgenographically. The investigation was completed by histologic studies.

The ligation of 1 ureter caused little disturbance of the animal's general condition, but ligation of both ureters caused severe shock and death within twenty-four hours.

The ureter dilates throughout its length both above and below the ligature. Its outer surface is covered with a rich network of blood vessels. Ligation of the ureter is followed immediately by complete cessation of the secretion of urine of varying duration which in turn is followed by oliguria. The duration and intensity of the oliguria depend upon the intra-ureteral pressure. When the ureter is emptied by puncture, the quantity of urine is increased. When the secretion of urine is renewed

after the initial period of anuria, the intra-ureteral pressure rises to about 60 mm. Hg. This increase tends to arrest the secretion of urine again unless the pressure is reduced by relaxation of the walls of the pelvis and ureter and absorption of a portion of the fluid retained or, as in the experiments, by puncture. Thereafter the quantity of stagnant urine depends upon the tonus of the walls of the upper urinary tract and especially upon the balance established between the secretory activity of the parenchyma and the power of absorption of the walls of the renal pelvis and ureter.

The authors are of the opinion that the period of survival of the obstructed kidney is prolonged first by the primary anuria followed by oliguria, then by the pyelo-ureteral absorption, and finally by the collateral circulation established. Anything that injures the unobstructed kidney and tends to increase the toxemia injures the obstructed kidney and shortens its life. Pyelovenous reflux and perirenal interstitial infiltrations are complications of the process of defense since the latter depends, on the one hand, upon checking the secretion of urine, and on the other, upon absorption of the excess of the urine that is secreted. The authors found that the absorption takes place chiefly in the terminal portion of the ureter and in the small calyces of the pelvis, where the arrangement of the epithelial cells shows definite evidence of adaptation to absorption.

The cessation of pain in cases of complete obstruction of the ureter usually depends upon the cessation of urinary secretion and diminution of the intra-ureteral pressure. However, it must be admitted that there may be renal colic due purely to spasm without an increase in the intra-ureteral pressure, since the ureteral muscle is as subject to "cramps" as all other muscles. ALICE M. MEYERS.

Schillings, M., and Sondervorst, F. A.: Primary Malignant Tumors of the Ureter (Les tumeurs malignes primitives de l'uretère). *Rev. belge d. sc. méd.*, 1936, 8: 225.

Until after the beginning of this century primary tumors of the ureter were never diagnosed clinically. They were confused with tumors of the kidney and recognized only at autopsy. Finally a few were discovered by endoscopic examination, at first done with hesitancy and then more systematically. Finally they attracted the attention of urologists, and now with the perfection of endoscopic and roentgen technique they are quite frequently diagnosed and if the diagnosis is made early they may be cured.

The authors review the history of primary malignant tumors of the ureter, summarize in a table 112 cases they have collected from the literature, and report 2 cases coming under their own observation.

The first of the authors' cases was that of a man sixty-eight years of age who came for consultation on account of hematuria. After cystoscopic and roentgen examination a probable diagnosis of tumor of the kidney was made, and in March, 1931, the right kidney and upper end of the right ureter were removed. Histologic examination disclosed only signs of chronic interstitial nephritis. On January 11, 1936, the patient was free from signs of recurrence.

The second case was that of a woman seventy-three years of age who came for treatment on account of pain in the kidney region and progressive emaciation. After careful examination a probable diagnosis of tumor of the right ureter was made. Operation disclosed a tumor of the upper end of the ureter so extensive that it could not be extirpated and a metastasis in the lower pole of the kidney. The neoplasm was a pavement-cell epithelioma of the ureter with metastases in the kidney, the retroperitoneal glands, the lumbar and iliac muscles, and the parietal peritoneum. The patient died that night of heart failure.

As the 3 classical symptoms—hematuria, pain, and hydronephrosis—are not at all pathognomonic, a very careful examination must be made by simple roentgenography of the urinary tract, intravenous or descending pyelo-ureterography, cystoscopy, chromocystoscopy, catheterization of the ureters, retrograde or ascending pyelography, and, if necessary, as in cases of very small or very large tumors, pneumopyelography.

The only treatment that gives any hope of permanent cure is nephro-ureterectomy in 1 or 2 stages with a large single incision or a double incision. If possible, the operation should be performed in 1 stage. If it must be in 2 stages the ureterectomy should be performed first. If the tumor is at the lower end of the ureter a considerable area of bladder tissue around the opening should be excised. Partial nephro-ureterectomy or segmental ureterectomy is sometimes followed by cure. The indications for these operations are determined by the nature of the tumor, its localization, the condition of the renal parenchyma, and the integrity of the part of the ureter that is not removed. After operation the patient should be kept under close observation.

Thermocoagulation and diathermy are not to be advised as their results are very mediocre. Roentgen therapy and radium therapy may be used in inoperable cases. As a rule they merely relieve the pain. Medical treatment is purely symptomatic. It is possible that chemotherapy of cancer may eventually be the treatment of choice, but as yet its effectiveness has not been proved.

AUDREY GOSS MORGAN, M.D.

BLADDER, URETHRA, AND PENIS

Lett, H.: On Urinary Calculus, with Special Reference to Stone in the Bladder. *Brit. J. Urol.*, 1936, 8: 205.

Among 279,569 patients admitted to the surgical wards of the London Hospital during the years from 1904 to 1934 there were 2,781 with stone in the urinary tract. Lett has grouped the cases of stone into five-year periods and shows the incidence of

such stone in men, women, and children. He discusses the frequency with which stone was found in the various parts of the urinary tract and the incidence of urinary stone formation in relation to sex and age. The findings of urinalyses are presented in a table. In the majority of 745 cases the urine was acid, no matter what the situation of the stone in the urinary tract.

There were 636 cases in which the author was able to obtain satisfactory cultures. The types of organisms are shown in a table. Staphylococcus albus was found in the majority of the cases, whether the stone was located in the kidney, ureter, or bladder. Bacillus coli communus was next in frequency, regardless of the site of the stone. The bacillus proteus was found most often when the stone was in the lowest part of the urinary tract.

The findings of complete microscopic examination of the urine are presented in a table. As would be expected, leucocytes were found more often than red blood cells. The incidence of blood or red cells in the urine was 73 per cent. In about two-thirds of the cases the urine contained crystals. In nearly all of them triple phosphate and calcium oxalate were present. Frequently on re-examination a change in the triple phosphate to calcium oxalate, or vice versa was found. Uric acid crystals were observed in only 4 cases.

In discussing stone in the bladder Lett cites a report made in 1819 on 506 cases in which operation was performed at the Norfolk Hospital in Norwich. Two hundred and thirty-five of the patients were children under fourteen years of age. The high incidence of bladder stone in children was attributed to dietary defects as the stones occurred most frequently in children of the poorer classes and were rare in children who were well fed. In men, the incidence of stone in the bladder increases rapidly up to between the forty-fifth and fifty-third years of age, then declines slightly, and at the age of eighty-nine or ninety years shows a marked decrease. Lett found 43 stones in women and 7 in young girls. In 8 of 19 cases of stone in the bladder which he treated there was a descending stone with no history of colic. In 1 case a diverticulum of the ureter was found. In 3 cases the stone formed around a foreign body introduced into the urethra; in 6 cases it followed injury and hysterectomy; and in 1 case it followed an injury to the bladder during cesarean section.

Lett describes the various symptoms which may be produced by bladder stone in males and females according to the position or activity of the patient and the size, shape, and composition of the stone. He discusses interruption of the urinary stream, which he states occurs in approximately 17 per cent of cases. In 13 of his cases incontinence occurred, but he states that this is very rare except in children and under certain conditions in adults. Of 162 cases, hematuria occurred in 90 (60 per cent). Lett believes that hematuria is not so frequent as is commonly supposed. He states that pus in the urine is to be expected in somewhat more than one-third of the cases, and that microscopic examination of the urine will reveal leucocytes in four-fifths of the others.

He states that pain, frequency, and hemorrhage are aggravated by exercise and jolting. He discusses the diagnosis of bladder stone on the basis of clinical evidence and the use of the sound. Today, as the result of the development of roentgenography and cystoscopy, this method has lost favor. However, as no one method can be relied upon to be infallible in every case, it is advisable, and sometimes essential, to employ all methods.

In reviewing the development of various types of operation for bladder stone, Lett discusses the relative merits of suprapubic cystotomy and removal of the stone with a lithotrite. He believes that the urologist with little experience in urethral and bladder surgery will obtain more successful results from the former procedure. GILBERT J. THOMAS, M.D.

Godard, H.: Plastic Operations on the Urethra (Les urétroplasties). *J. d'urol. méd. et chir.*, 1936, 42: 105.

Godard, in a general review of plastic operations on the urethra for the treatment of hypospadias and loss of substance of the male urethra, states that the number of operations proposed is "amazing." This is due in part to the fact that in plastic surgery the personal factor is of the greatest importance. A surgeon may obtain good results with an operation devised by himself although, when performed by others, it proves unsatisfactory. In France, 5 techniques are widely used at the present time. These are the Beck-von Hacker, Duplay-Marion, Ombrédanne, Nové-Josserand, and Mathieu techniques.

The various procedures employed in plastic operations on the urethra are classified according to the type of operation and also according to the particular indication. To repair a defect in the penile urethra the following types of operation are performed: (1) the simple formation of a tunnel; (2) procedures based on the extensibility of the urethra; (3) plastic methods with the use of pedicled flaps from the penis, prepuce, or scrotum; and (4) plastic methods with the use of autoplastic, homoplastic, or zooplastic free grafts. The procedures for repair of the perineal urethra are: (1) mobilization and extension of the urethra; (2) plastic procedures with the use of pedicled flaps from the perineum; and (3) plastic procedures with the use of pedicled grafts from the scrotum.

The author states that loss of substance and hypospadias in the region of the glans penis may be treated by the Beck-von Hacker, Bevan, Chocholka-Marion, or Ombrédanne methods or their modifications. Loss of substance and hypospadia in other portions of the penile urethra may be treated by the Duplay-Marion, Ombrédanne, Chocholka-Marion, or Nové-Josserand-Rochet method. Godard is of the opinion that the Ombrédanne operation is the

only one which may be used for all of the usual types of hypospadias with practically no variation in the technique. He points out that, contrary to what might be expected, posterior hypospadias (penile, penoscrotal, or perineal) is more easily corrected than glandular hypospadias.

Defects of the perineal urethra may be treated by procedures of mobilization and extension of the urethra (Mikulicz, Ekehorn). The hermaphrodite type of hypospadias (vulviform hypospadias) requires not only several plastic operations, but in some cases reconstruction of the genitals to conform with the true sex. The author believes that in such cases the operation should not be attempted before puberty and not until the sex has been determined by laparotomy or, if necessary, histologic examination of the gonads.

Of the plastic operations based on the extensibility of the urethra, the Beck-von Hacker procedure is most favored. It is indicated, however, only in hypospadias at or very near the glans. It is usually done before the end of the second year of life. The author is of the opinion that, even in the cases in which it is chiefly indicated, this operation may have serious complications and undesirable end-results such as fistula, stricture, or deformity of the penis. A number of surgeons who have used it have abandoned it.

In plastic operations with the use of pedicled flaps certain principles are generally recognized. In plastic operations on the penis satisfactory results require the use of flaps having essentially the same texture and the same elasticity as the tissue they are to replace. These requirements are met best by the penile and scrotal skin. The flaps should be sufficiently large to insure their vitality so that necrosis will not occur. Tension on the sutures must be avoided. The procedure used should be such that, in case of failure, it will not make the anatomic condition worse than the original malformation. The favorable age for operation for hypospadias by any of these methods is between the sixth and ninth years of age. In cases of loss of substance due to trauma or other causes, operation should be delayed until cicatrization is complete. The end-results of all these operations should be more carefully studied and reported.

In the Duplay-Marion, Thiersch, Bevan, Chocholka-Marion, and Mathieu techniques the penile skin is used for grafts. The technics of Thiersch and Bevan are little employed at present. The Duplay-Marion technique is not suitable for hypospadias in the region of the glans, and when used to reconstruct the urethra in penile or penoscrotal hypospadias must often be completed at a later date by some other procedure such as the Chocholka-Marion operation. In the operation first described by Chocholka and perfected by Marion, the penile graft is sutured over a Nélaton tube, which is later removed. This procedure has given good results in a few cases, but there have been no reports of its use in a large series of cases.

Among the methods in which combined flaps from the penis and prepuce are used are those of Ombrédanne, Birkenfeld, Rüssel, Gersuny, and Meyer. The technique of Ombrédanne can be employed in any of the usual types of hypospadias and does not necessitate derivation of the urine. The chief objection to it is that it must be done in several stages. It is more widely used than any other method, and gives good results when performed by most surgeons. The other methods of this type have been derived to a large extent from Ombrédanne's technique. They have given good results in the hands of their originators, but have not been widely used by others.

In other methods a graft from the prepuce alone is used. As a rule this graft is too long and narrow and is liable to undergo necrosis. Moreover, such methods have limited indications. Other pedicled grafts—grafts from the abdominal skin (in 1 instance a tube graft) and from the bladder mucosa—have been used.

Of the methods in which free grafts are employed, the procedure of Nové-Josserand with the use of an autogenous dermal-epidermal graft has been more widely used than any other of this type. Nové-Josserand has reported satisfactory results from this method, but others have not equaled his results. The method demands prolonged postoperative care. In a few cases tissues other than the skin have been used for free grafts. In the heteroplastic graft operations, various tissues have been employed. None of these operations has given satisfactory results and only a few have been attempted. The essential fault of free grafts in the treatment of urethral lesions (hypospadias and loss of tissue) is that they tend to heal by the formation of cicatricial tissue which necessitates prolonged postoperative treatment by dilatation or urethrotomy. Therefore their use has been generally abandoned.

The article contains illustrations showing the techniques of many of the operations mentioned.

ALICE M. MEYERS.

GENITAL ORGANS

Chauvin, E.: Primary Tuberculosis of the Seminal Vesicles (La tuberculose primitive des vésicules séminales). *Arch. d. mal. d. reins et d. organes genito-urinaires*, 1936, 10: 63.

Contrary to general belief, tuberculosis of the seminal vesicles may be the primary lesion in genitourinary tuberculosis, and localization of tuberculosis elsewhere, particularly in the epididymis, secondary. This has been demonstrated by numerous observations. Of 26 cases of genital tuberculosis coming to autopsy, Guyon found the seminal vesicles alone involved in 2. Similar cases have been reported by Saxtorph, Simonds, and Barbelion. Astraldi and Lancereaux have seen tuberculous epididymitis retrogress after section of the vas deferens.

In the seminal vesicles any of the forms of tuberculous inflammation may occur, but nodular tu-

bercles are most common. It is of importance that even massive caseation remains limited by a thick fibrous wall and seldom produces fistulas. Healing occurs by fibrosis, encystment, and, occasionally, calcification.

Among the manifestations of primary tuberculosis of the seminal vesicles are hemospermia, hematuria, pollakiuria, urethral discharge, perineal pains, spontaneous erections, rapid and painful ejaculation, and spermatorrhea.

On rectal examination the seminal vesicles are found large and usually nodular. Occasionally, with massive caseation, they have a waxy consistency. Induration combined with a remarkable freedom from pain on palpation is the chief characteristic differentiating tuberculous from other forms of seminal vesiculitis.

The diagnosis is difficult. The urinary disturbances suggest a renal lesion, and localization of the tuberculous process in the seminal vesicles is possible only by systematic study. A urethral discharge which has been chronic from the beginning is always suggestive. However, this is rare. As a rule the physician is confronted by the problem of distinguishing the lesion from a chronic gonorrheal lesion. The tubercle bacillus may be found in the urethral discharge or in the urine. Its presence after lavage of the bladder and massage of the vesicles is especially suggestive.

The treatment is essentially medical. Surgical treatment is limited to section of the vas deferens to prevent extension of the tuberculous process to the epididymis. This procedure nearly always accomplishes its purpose. ALBERT F. DE GROAT, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Petersen, G. Fr.: A Case of Osteopoikilosis. *Acta radiol.*, 1936, 17: 388.

Osteopoikilosis, a condition characterized by an irregular spotted appearance of the bones, is known also as "disseminated condensing osteopathy" and "generalized condensing osteitis."

The spots are due to areas of increased density varying from a few millimeters to 2 cm. in diameter. They are most numerous in the ends of the long bones and in the bones of the hands, feet, and pelvis.

By most of those who have written on the subject osteopoikilosis is considered an anomaly, but in some cases it is associated with enough pain to suggest pathologic changes. It is rather rare and usually discovered only incidentally during roentgen examination for some other condition. Skin lesions in the form of raised efflorescences may be present on the abdomen, back, arms, and thighs, and neuropathic symptoms such as vasomotor instability, tremor, and neuralgias may occur.

In some cases the affection is hereditary. Although developmental, infectious, and congenital origins have been suggested, its cause is unknown. No abnormalities of the parathyroid glands or of the calcium content of the blood have been noted.

In the diagnosis the question of metastatic carcinoma may arise, but this condition can usually be ruled out by the history and the more generalized disturbance in osteopoikilosis. Although osteopoikilosis was first described by Albers-Schonberg, it must not be confused with "marble bones," a disease which bears his name and has nothing in common with it.

The case reported by Petersen was that of a man thirty-four years of age who complained of pain in the left scapular region following a fall. On roentgen examination numerous opaque calcareous spots from 2 to 5 mm. in diameter were found in the head of the humerus and the glenoid. Further search revealed lesions of the same type in all of the long bones, where they were massed most densely near the joints, in the bones of both hands and feet, and in the pelvis, especially the ischium and pubic bones. There was a pronounced spondylitis deformans, and exostoses were found on the right tibia and femur. Movements of the shoulder joint were painful. The spine was stiff, and there was an arcuate kyphosis. The skin in the interscapular region showed patches of pityriasis versicolor.

The blood count, hemoglobin, and blood pressure were normal. The calcium content of the blood was 11.7 mgm. per cent. The Kahn test was negative.

The patient's family history as well as his personal history revealed nothing of significance, but roentgenograms of his mother showed some degree of atrophy of all of her bones and a small round opaque spot in each of the fifth metacarpal bones; those of one brother, a small but distinct cavity in the left lunate bone; and those of another brother, opaque spots in the heads of the metacarpal and metatarsal bones and in the distal epiphysis of the radius. WILLIAM ARTHUR CLARK, M.D.

Goin, L. S., and Carroll, R. L.: Primary Bone Tumors in Children. *Radiology*, 1936, 27: 261.

The authors report their findings in 117 cases of primary bone tumor in children. Eighteen and six-tenths per cent of the tumors were malignant. On the authors' service the general incidence of bone tumor has been 1 tumor to 180 admissions, and the general incidence of malignant bone tumor, 1 tumor to 888 admissions.

The authors classify bone tumors into: (1) those arising from osteogenetic elements, (2) those arising from tissues within bone, and (3) those which are metastases in bone.

In the first group are osteomas, osteochondromas, exostoses, chondromyxomas, enchondromas, and chondromas. Osteomas, osteochondromas, and exostoses are usually benign and occur under the age of twenty years. In cases of osteoma and exostoses simple excision is sufficient as a rule, but for those of osteochondroma the authors recommend postoperative irradiation as tumors of this type sometimes have a tendency to recur.

Chondromyxomas, enchondromas, and chondromas are rather common. They are central tumors expanding the bony tissue which arise from cartilage cells and occur in the diaphyses near the epiphyses. They produce no bone. They are most frequent in the first 3 decades of life. Because of their tendency to recur, which makes them potentially malignant, excision should be followed by irradiation.

Malignant chondrosarcomas are divided by the authors into the primary and secondary types. Those of the primary type include the periosteal sarcomas with their characteristic "sun-ray" arrangement. These tumors often become very large and metastasize rather late. As they are extremely malignant, they are best treated by amputation. The tumors of the secondary type include neoplasms presumably arising from embryonal rests within a benign lesion. They are very infrequent in children and much less malignant than the primary tumors. They are best treated by amputation with intensive pre-operative and post-operative irradiation.

By the term "osteogenic sarcoma" the authors designate sarcomas causing bone production. The most common sites of these tumors are the femur, tibia, and humerus. Their growth extends over

periods ranging from two weeks to four months. The swelling is fusiform, the pain steadily grows more severe, mild fever and moderate leucocytosis are not infrequent, and the more highly malignant growths may destroy life within a short time. The authors divide osteogenic sarcomas into the osteolytic and osteoblastic types. The former are the more malignant.

In their discussion of bone cysts the authors include only solitary cysts occurring in the metaphyseal portions of long bones. These tumors occasionally cause no symptoms. They respond well to either surgery or irradiation. They must be differentiated from solitary bone abscess, chondroma, myeloma, and the osteolytic form of osteogenic sarcoma.

The giant-cell tumors are closely related to bone cysts. The authors believe they may be merely variants of the latter. In one-half of their cases there was a history of injury. The average age of the patients at the time of their admission to the hospital was fourteen years. Giant-cell tumors always arise in the region of the epiphysis. The symptoms are moderate pain and a varying degree of swelling. The authors prefer roentgen therapy to surgery. They believe that in spite of the occasional report of a malignant giant-cell tumor, neoplasms of this type are to be regarded as benign.

In their discussion of tumors arising from tissue within bone the authors consider the diffuse endothelial myeloma or Ewing's tumor. They believe that this neoplasm is by no means rare as there were 6 cases in their series. The average age of their patients was ten years. The symptoms had been present for from six weeks to six months. In all of the cases the condition had been diagnosed at one time or another as osteomyelitis. The important differential points between Ewing's tumor and osteomyelitis are summarized by the authors as follows:

	EWING'S TUMOR	OSTEOMYELITIS
Temperature	Usually 99 to 100 degrees F., but may go higher. In 1 case it reached 103.9 degrees F.	From 102 to 105 degress F.
Blood Leucocyte count	Usually from 9,000 to 11,000; rarely higher.	From 10,000 to 15,000 or higher.
Differentia count	Polymorphonuclear cells normal or decreased; lymphocytes increased.	Polymorphonuclear count increased.
Roentgen findings	Appear early.	No demonstrable early changes.
Roentgen treatment	Followed by improvement promptly.	No change in symptoms.
Aspiration biopsy	May permit positive diagnosis	
Sequestrum	Absent	Present later.
Periosteum	Stripped, with "lipping" at point of reflection.	Intact unless broken through as for pus drainage.

The authors believe that in cases of Ewing's tumor death is usually due to metastasis, and that under no circumstances should surgical interference with the tumor itself be attempted. The treatment of choice appears to be irradiation.

They express doubt that myeloma occurs in children as they have found it only in young adults and older persons.

They state that fibrosarcoma and neurosarcoma are rare tumors and, properly speaking, not bone tumors but neoplasms of fibrous and nerve tissues invading bone.

Tumors which are metastases in bone are merely mentioned as they are not primary bone tumors.

The authors conclude that primary bone tumors are common in children and occur most frequently in regions of bone where growth is most intense and at the age when growth is most rapid.

PAUL C. COLONNA, M.D.

Taylor, G. D., Ferguson, A. B., Kasabach, H., and Dawson, M. H.: Roentgenological Observations on Various Types of Chronic Arthritis. *Arch. Int. Med.*, 1936, 57: 979.

The authors report the findings of a roentgen study made in 300 cases of the common varieties of chronic arthritis with particular attention to the rheumatoid and osteo-arthritic types. The patients were seen in the Arthritis Clinic of the Presbyterian Hospital, New York, and at the New York Orthopaedic Dispensary and Hospital. Rheumatoid arthritis and osteo-arthritis were considered separate clinical entities.

The roentgenologists in the investigation, Ferguson and Kasabach, were given no clinical information regarding the patients except the duration of the symptoms and the degree of function present in the joint. Six of the outstanding changes observed —decalcification, production of bone, destruction of

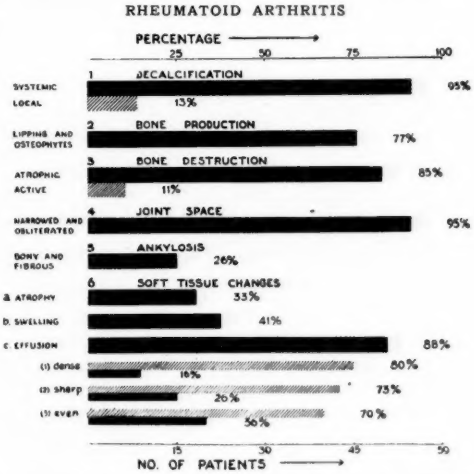


Fig. 1. Observations on patients with rheumatoid arthritis.

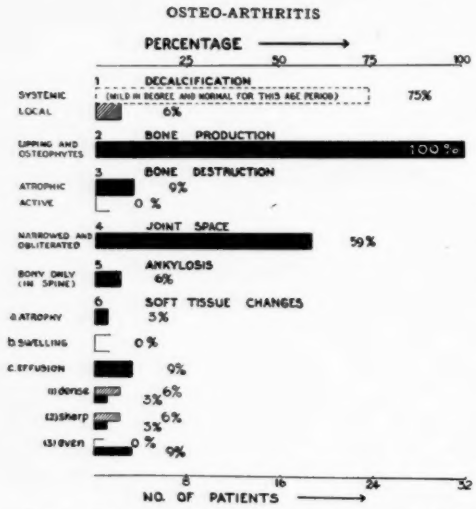


Fig. 2. Observations on patients with osteo-arthritis.

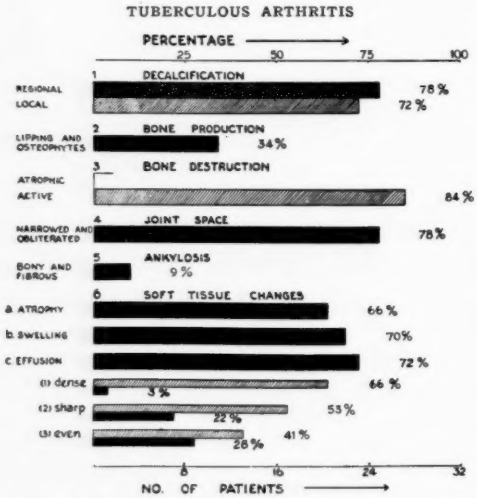


Fig. 3. Observations on patients with tuberculous arthritis.

bone, ankylosis, changes in the joint spaces, and changes in the tissues—are discussed in detail and their incidence in cases of rheumatoid arthritis, osteo-arthritis, and tuberculous arthritis is shown by graphs.

Attention is called to the fact that in each type of chronic arthritis studied the roentgen findings showed a basic grouping or pattern. The authors emphasize that more than one area should be examined, and that, regardless of the joint of which the patient complains, roentgen examination of the hands, feet, and knees, and of the lumbar portion of the spine should be made. They believe that information obtained by careful study of the shadows produced by the periarticular soft tissues is of great importance in the differential diagnosis of the various forms of chronic arthritis. They state that to interpret the roentgen shadows correctly the roentgenologist must know at least the duration and severity of the symptoms in the joints. These facts are of the greatest importance in establishing the diagnosis, as the appearance of a gonococcal joint of six weeks' duration may closely resemble that of a tuberculous joint of six months' duration. On the basis of the roentgen findings the authors conclude that rheumatoid arthritis and osteo-arthritis are distinct entities, and that even when both types occur in the same patient it is usually possible to differentiate the characteristic changes of each in the roentgenogram.

They emphasize particularly that while no single roentgen feature is diagnostic of any one type of chronic arthritis, the roentgen findings in each type are characterized by a basic pattern or grouping which is in agreement with the clinical diagnosis. Therefore roentgenograms carefully interpreted are of definite aid in the diagnosis and in determination of the prognosis of the various types of chronic arthritis. PAUL C. COLONNA, M.D.

Guilleminet, M.: Spondylolisthesis (Le spondylolisthesis). *Rev. d'orthop.*, 1936, 43: 385.

While spondylolisthesis was a long time regarded as only an anatomical curiosity and a possible source of difficulty in obstetrics, it is now considered a problem in surgical orthopedics. It is the slipping of a vertebra on the vertebra below it—usually of the fifth lumbar vertebra on the sacral. As a rule the body of the fifth lumbar vertebra extends only partly beyond the edge of the sacrum or balances on it. In addition to the displacement it undergoes a deformity which results in fixation rendering replacement impossible.

The cause of spondylolisthesis is generally a spondylolysis, that is, the presence of a transverse fissure which divides the fifth lumbar vertebra into an anterior and a posterior half. The anterior half slips forward. The fissure can be seen easily in the dry bone, but in the living subject is less readily detected as it is covered with periosteum. It is a sort of lateral spina bifida. The author believes the condition is of congenital rather than traumatic origin, and that trauma merely makes manifest an anomaly that was already present in latent form.

Spondylolisthesis may be even more frequent in males than in females. The majority of the subjects are between twenty-five and fifty years of age, but many of them are less than fifteen years old. In the latter the condition is generally acknowledged to be congenital.

The clinical appearance of the patient is characteristic. The trunk is pushed forward, the waist measurement is decreased sometimes several centimeters, the iliocostal space is decreased or abolished, and there are large skin folds parallel with this space. Because of the disproportion the arms appear abnormally long.

The chief symptom is pain which is often so severe as to incapacitate the patient completely.

Clinical diagnosis is possible and is definitely confirmed by roentgen examination. The frontal roentgenogram is not sufficient for absolute diagnosis; profile roentgenograms should be taken also. They show the extent to which the vertebra has slipped and any reactional ossification. The author presents illustrative roentgenograms. With the improved apparatus in use at the present time the spondylolysis can also be demonstrated.

Orthopedic treatment with corsets may be used, but requires a long time and often fails. Anatomically there is no ideal surgical treatment with complete replacement of the displaced vertebra. In the cases of patients with heart, lung, or kidney disease, diabetes, or obesity operation should not be attempted. It is generally contra-indicated also after the fiftieth year of age. However, Wilson operated on a woman sixty years old. Surgical treatment is not dangerous as in the 42 surgically treated cases reported there was only 1 death.

If the roentgenogram shows that the fifth lumbar vertebra is only moderately displaced and still has good support on the sacrum, osteosynthesis by a posterior graft may be done. The double paraspinous graft is perhaps surer than the Albee graft. However, when there is very marked displacement arthrodesis is to be preferred to posterior osteosynthesis. There are 2 techniques for iliotransverse arthrodesis—that of Lance and Aurousseau and that of Mathieu and Demirleau. Both of these are shown in illustrations. In the latter, which the author regards as the simpler, a tibial graft is passed through the iliac bone and fixed in a slit in the transverse process of the fifth lumbar vertebra. Operation for spondylolisthesis should be preceded by rest in bed with continuous traction and should be performed on a plaster bed. After the operation the patient should be kept in bed for three or four months and should wear a plaster corset when he first gets up.

Atypical forms of spondylolisthesis are discussed briefly.

The article is followed by a long bibliography.

AUDREY GOSS MORGAN, M.D.

Boudreaux, J.: Primary Tumors of the Spine (Les tumeurs primitives du rachis). *J. de chir.*, 1936, 48: 352.

Primary tumors of the vertebræ are of course rare in comparison with secondary tumors, but the exact proportion between the 2 types is not known. Schlesinger reported that in 35,000 autopsies 107 vertebral tumors were found and that 41 were primary, but the author is of the opinion that some of those believed to be primary were secondary. Boudreaux reports 11 new cases of primary tumor—1 myeloplasmocytoma, 3 giant-cell tumors, 3 angiomas, 2 chondromas, and 1 solitary cystic tumor.

The malignant tumors of the spine are myelomas, Ewing's tumors, osteosarcomas, fibrosarcomas, and chordomas. The most common of these are the myelomas. Myelomas may involve several vertebræ. The bone is softened and the cortex thinned. Later the body may collapse or buds may extend into the canal and compress the cord. Histologically, in addition to the true myeloma, it is necessary to recognize the plasmocytoma, which progresses more slowly. The symptoms are gradually developing deep rheumatic pains followed by severe nerve-root pains. As a rule the condition is fatal in from one and a half to three years. The cause of death is usually medullary compression. Radiotherapy gives temporary relief.

Ewing's tumor (reticulo-endotheliosarcoma) is rare in the spine. It occurs in young persons and usually has a costovertebral location. It may be accompanied by fever. It responds to irradiation therapy, but is ultimately fatal as a rule within two years.

Osteosarcomas and chondrosarcomas of the vertebræ are rare. They occur in young adults, usually in the thoracolumbar region. Sarcoma of a vertebral body generally compresses the cord, while sarcoma of a vertebral arch generally does not invade the canal. These tumors resemble osteogenic sarcomas of the long bones in their gross and microscopic characteristics. Roentgenograms show simple osseous destruction. The prognosis is poor, death usually occurring in several months. Irradiation is the only treatment.

Periosteal fibrosarcomas are a poorly known group of tumors which progress slowly and are of low-grade malignancy.

Chordomas are vestigial tumors derived from the remains of the notochord. They occur in late adult life. Seventy occurring in the sacrococcygeal region and 22 occurring in the spine itself have been reported. Intracranial occipital chordomas have also been observed. Chordomas are infiltrating and whitish, often cystic, and at times encapsulated. Histologically they are characterized by large bullous cells, the "physaliphorous cells" of Virchow. In spite of their relatively benign appearance, they are malignant. Many of them can be removed, but recurrence is the rule.

The benign tumors of the spine are giant-cell tumors, hemangiomas, chondromas, and certain unusual neoplasms.

Giant-cell tumors may occur at any level in the spine—both in the bodies and in the arches of the vertebræ. They vary from small localized neoplasms to large, diffuse, destructive growths. Many are preceded by trauma. Several vertebræ may be involved, but the intervertebral disks are respected. As a rule the neoplasm causes a poorly localized

pain which increases slowly over a period of from six to twelve months. Paraplegias often develop. A slight painful kyphosis or a palpable tumor may be felt. The roentgenogram is not diagnostic. As a rule it shows osseous destruction. If untreated, a tumor of the body of a vertebra leads to fatal compression of the cord. Surgical removal is difficult and dangerous because of hemorrhage. The incidence of recurrence is about 50 per cent. A recurrence may behave like a true sarcoma, but at times, after a period of growth, it decreases in size and becomes ossified.

Angiomas are more frequent. There are reports of their discovery in 11 per cent of subjects coming to autopsy. Often they are found accidentally in routine roentgen examinations of the spine. They occur at all ages and are often accompanied by epidural angioma. In 65 per cent of cases only 1 vertebra is involved. As a rule this vertebra is in the thoracolumbar region. The bone is porous and shows multiple small channels filled with blood which are separated by thin trabeculæ. As the tumor grows the bone may become enlarged, but its density decreases and collapse may occur. The tumors develop slowly. Operation is difficult because of the danger of hemorrhage.

Chondromas are rare. Only 27 cases have been reported. They occur most frequently in the third decade of life. They may be multiple, and are sometimes associated with osteogenic disturbance. Their most frequent site is the thoracic region. The tumor may involve the arches or the body of the vertebra. In the latter it may extend into the canal or pass through the foramen to form an hour-glass tumor. In about half of the cases several neighboring vertebræ are involved. Roentgenograms may be helpful in the diagnosis. The tumors develop slowly, but the danger of paraplegia and of sarcomatous degeneration demands their removal.

Among the rare primary tumors of the spine are lipomas, periosteal fibromas, osteomas, and cysts.

In general the differential diagnosis of primary tumors of the spine is difficult as the signs, symptoms, and roentgen appearance of all such neoplasms are much the same. In some cases biopsy can be done. The possibility that the tumor is a secondary neoplasm must be ruled out. The treatment also is difficult as a rule. Tumors of the processes and laminæ are relatively easy to reach, but those of the body are hard to expose. In the lumbar region the latter can be approached by an anterior subperitoneal route. Otherwise they must be reached laterally after costotransversectomy or, if there is compression of the cord, posteriorly by laminectomy. Some of the malignant tumors should be treated by irradiation.

MAX M. ZINNINGER, M.D.

Rendich, R. A., and Shapiro, A. V.: Osteitis Condensans Ilii. *J. Bone & Joint Surg.*, 1936, 18: 899.

The condition discussed by the authors is a roentgenologically demonstrable localized area of increased density of variable size in the inferior and medial portions of one or both iliac bones adjacent to the sacro-iliac joint. The sacro-iliac joint is not involved, and there are no evidences of arthritis. The process may spread upward even to the iliac crest. Its outer border fades gradually into normal bone. It was previously described as a unilateral condition occurring in women after pregnancy, but the authors have observed 4 cases in which it was bilateral and have seen it in the pelvic roentgenograms of 3 males.

The symptoms are not constant. In some cases there are no symptoms. Several of the authors' patients had a definite low-back pain aggravated by bending. Localized tenderness and muscle spasm may be present. The cause is not known. Trauma is not a probable factor. Circulatory disturbances and low-grade infection in the bone are possibilities. In their series of cases the authors excluded other bone lesions known to produce sclerosis.

CHESTER C. GUY, M.D.

Cohen-Solal, L.: Acute Primary Suppurations Developing in the Sheath of the Iliopsoas. (Les suppurations aiguës primitives developpées dans la gaine du psoas-iliaque). *Rev. de chir.*, Par., 1936, 55: 534.

Most references to the occurrence of pus in the psoas sheath are to cases of secondary infections, the pus originating in neighboring tissues and draining through the psoas sheath. In 1742 Mauquet de la Motte called attention to the relation of flexion contracture of the thigh to abscess in the psoas sheath. In 1929 Poucel advanced the theory that primary iliopsoas inflammation is only a reaction transferred from a neighboring adenitis. In 1934, Bolté furnished anatomic proof of this theory by describing definite lymph nodes in the vertebral insertion of the psoas muscle fibers.

According to Lombard, the primary psoas infection may occur by way of either the blood stream or the lymph channels.

The iliac fascia which covers the iliopsoas muscle extends down to the lesser trochanter, which explains involvement of the tissues of the thigh secondary to psoas infection. It is in intimate contact also with a close plexus of blood vessels and lymph channels, which explains the ease with which it becomes infected.

The infection is usually on the right side, possibly because appendicitis is frequently the original focus. Two aspects of the lesion are possible: a generalized swelling of the muscle without abscess formation, or the definite collection of pus into pockets.

Children are more often affected than adults. The onset may be sudden, but as a rule is insidious. The child limps a little, complains of pain, and is unable to extend the hip completely. Soon the pain becomes so severe as to confine him to bed. A rather hard tender swelling can be felt between the vertebral column and the ilium. Neither the ilium nor the spine is tender. Pressure on the lesser trochanter is painful. There is a leukocytosis, and the tempera-

ture may go as high as 40 degrees C. The pus may discharge into the peritoneal cavity with fatal results, or there may be a terrific hemorrhage due to ulceration through the wall of a blood vessel. The most frequent complication is acute arthritis of the hip joint.

The diseases which may simulate iliopsoas infection are acute arthritis of the hip, osteomyelitis in the region of the hip or in the vertebral column, and acute retrocecal appendicitis.

Necrosis of the psoas muscle always occurs. There may be a hematoma from trauma preceding the infection. Sometimes a lesion of entry can be found on the leg or foot.

The benign forms may subside under treatment by extension of the leg and the application of hot fomentations to the tender area. The grave septicemic form which rarely suppurates will require general medical treatment. In cases in which abscess occurs drainage may be established by incision into the psoas sheath through an approach close to the ilium. The movements of the abdominal viscera aid in evacuation of the pus.

The prognosis is now more favorable than formerly because of more accurate diagnosis and better drainage. WILLIAM ARTHUR CLARK, M.D.

Badgley, C. E., Yglesias, L., Perham, W. S., and Snyder, C. H.: A Study of the End-Results in 113 Cases of Septic Hips. *J. Bone & Joint Surg.*, 1936, 18: 1047.

One purpose of the study reported in this article was to determine the essential differences between streptococcal and staphylococcal infections of the hip joint. The authors present tables which indicate that the important factor is the localization of the primary infection. If the infection is primary in the synovial cavity, rapid healing with joint mobility and freedom from recurrence may be expected regardless of whether the infection is streptococcal or staphylococcal. Primary osteomyelitis followed by secondary joint invasion leads to complications such as delayed healing, draining sinuses, and recurrence as long as the osteomyelitis remains active.

A frequent complication of pyarthrosis of the hip is dislocation. This occurred in 34 of the cases reviewed. It is generally due to flexion, adduction, and internal rotation of the leg when the capsule has become distended or ruptured. As a rule it can be prevented by traction with the leg extended and slightly abducted. When it occurs, drainage from the joint may be improved, but it is generally followed by sequestration or absorption of the femoral head, and in at least half of the cases the functional end-result is poor.

Sequestration of the femoral head occurred in 21 of the cases reviewed. In all but 4 it was preceded by dislocation or definite pathological changes in the head or neck, such as epiphysiolysis or osteomyelitis. The anterior or anterolateral approach to the joint is less liable to damage the blood supply of the head than arthrotomy performed by Ober's incision. Of the 21 patients whose cases are reviewed, 4 died and 14 others had a marked or complete residual ankylosis.

In 43 of the reviewed cases the femoral head was eventually lost either by surgical removal or by spontaneous absorption. This occurred particularly in patients under six years of age after sequestration of the head or pathologic dislocation.

Fourteen of the 113 patients died. In the majority healing occurred eventually, but only 7 had normal function. Twenty-three had a functional joint with normal motion of 50 per cent or more. Dislocation and epiphysiolysis can be prevented by early arthrotomy and fixation in abduction and extension. Arthrotomy is indicated for the drainage of pus or the eradication of an osteomyelitic focus. The age of the patient is important. In the cases of patients under two years of age the lesion is probably primary in the synovial cavity and the prognosis is good. The prognosis is good also in the cases of patients between two and five years of age if there is no bone infection. Between the ages of six and eighteen years osteomyelitis is common, complications develop, and the functional end-result is apt to be poor. CHESTER C. GUY, M.D.

Cella, C.: The Importance of the Blood Vessels of the Round Ligament in the Growth of the Head of the Femur (Sulla importanza dei vasi del legamento rotondo nel processo di accrescimento della testa femorale). *Chir. d. organi di movimento*, 1936, 22: 1.

Cella states that a number of investigators have shown that the head of the femur receives its blood supply from 3 sources: (1) the diaphysis of the femur, (2) the epiphysis, and (3) the round ligament. With regard to the relative importance of each of these sources in the young and adult individual there is considerable difference of opinion.

Cella carried out a series of experiments on cats, rabbits, and dogs of various ages. In the cats and rabbits he dislocated the head of one femur anteriorly by flexing, adducting, and externally rotating the thigh until the round ligament was torn and then replaced the head of the femur in the joint cavity by reversing these movements. In the dogs he severed the round ligament surgically. The animals were killed from 5 to 135 days after the operation.

In the animals which were operated on one day after birth, i.e., prior to the formation of a center of ossification, there were no macroscopic changes in the shape or size of the head of the femur, but microscopic examination at the site of insertion of the round ligament revealed an area in which the cells stained poorly and their nuclei were small and shrunken.

In the animals which were operated on ten days after birth there were no macroscopic changes, but microscopic examination showed the area of insertion of the round ligament to be markedly ischemic and that each cell in this region had a small nucleus and a granular cytoplasm. In some places the tissue

seemed to be replaced by an homogeneous mass. The centers of ossification appeared normal.

In the animals which were operated on forty days after birth and examined five months after birth, and in old animals there were no macroscopic or microscopic findings.

From these observations the author draws the following conclusions:

1. The blood supply of the round ligament in young animals, prior to the formation of an ossification center in the head of the femur, contributes to, but is not indispensable for, the nutrition of an osseous area which corresponds to the site of attachment of the round ligament to the head of the femur.

2. This blood supply decreases in importance rapidly with advancing age, so that by the time of the formation of the ossification center its suppression gives rise to no changes in the head of the femur or at the site of insertion of the round ligament.

3. The blood supply derived from the round ligament has no importance whatever in the development of the ossification center of the head of the femur. The blood supply of this center is derived mainly from the posterior circumflex artery of the thigh.

RICHARD E. SOMMA, M.D.

Logroscino, D.: The Round Ligament and Its Arteries in the Pathology of the Epiphysis of the Femur (Il legamento rotondo e le sue arterie nella patologia dell'epifisi femorale). *Chir. d. organi di movimento*, 1936, 22: 111.

In studying the blood supply of the round ligament in embryos 200 mm. long the author found that in the region of this ligament there are 2 main arterial vessels which originate from the acetabular branch of the obturator artery and subdivide into fine branches which are distributed in a fan-like arrangement to the superior pole of the epiphysis. These arteries are very important for the nutrition of the epiphysis of the femur, but are less important than the arteries derived from the metaphysis. There are numerous delicate anastomoses between the arteries of the round ligament and those of the supero-external and inferomedial tracts of the epiphysis which are derived from the synovial vessels of the metaphysis.

These vascular conditions prevail up to the ninth month of pregnancy. In the full-term infant the round ligament has the form of a somewhat flattened cord and is about 8 mm. long.

In discussing the pathologic changes and the clinical aspects of conditions involving the epiphysis of the femur, the author first takes up subcapital fractures of the epiphysis. He states that in cases of complete interruption of the vessels of metaphyseal origin the epiphysis derives its nourishment only from the arteries of the round ligament and therefore, depending upon the anatomic and functional integrity of these vessels either an aseptic necrosis of the epiphysis results or, by secondary revascularization, a callus is formed and union of the fragments occurs.

In traumatic detachments of the epiphysis the mechanical and biological conditions are similar to those in subcapital fractures of the femur, but these lesions are observed in individuals of different age groups. The ultimate outcome depends upon the conservation of the blood supply. If all of the arteries are destroyed by the trauma, necrosis of the epiphysis is inevitable.

In cases of idiopathic detachment of the proximal epiphysis of the femur the findings of recent investigations and of autopsies have led to the consideration of such factors as trauma, static forces in growing individuals, endocrine disturbances, and vascular lesions of the arteries of the round ligament in individuals with vasomotor disturbances as possible causes.

Dislocations of the hip joint are subdivided by the author into: (1) traumatic dislocations, in which laceration of the round ligament is often inevitable; (2) congenital dislocations, in which the round ligament is gradually flattened without impairment of its anatomical integrity but with a consequent change in its shape in adult life; and (3) paralytic dislocations, which are often observed in association with various types of paralysis, especially poliomyelitis.

Logroscino next discusses cases of epiphysitis caused by tuberculous, staphylococcal, and streptococcal infections and those syndromes which are due to internal incarceration and laceration of the round ligament. In the latter the most characteristic symptoms are: (1) pain, due to compression of the nerves of the ligament derived from the obturator and femoral nerves; (2) local swelling and reflex rigidity due to an intra-articular transudate caused by the interruption of the blood stream; (3) elevation of the temperature due to shock and absorption of the transudate; and (4) trophic disturbances of the epiphysis due to sudden interruption of the intraligamentous blood supply.

RICHARD E. SOMMA M.D.

King, D.: The Function of the Semilunar Cartilages. *J. Bone & Joint Surg.*, 1936, 18: 1069.

In a series of experiments on dogs' knees the internal or external semilunar cartilages were partially or completely excised and the condition of the joints determined three or four months later. It was found that partial or complete extirpation of the internal meniscus was followed by replacement by new tissue resembling fibrocartilage which grew from the synovial membrane. In spite of this replacement, the examination revealed roughening and degeneration of the articular hyalin cartilage proportional to the amount of cartilage excised. Excision of the external meniscus was also followed by this degeneration, but not by false cartilage formation. The author concluded that the function of the semilunar menisci is to protect the articular hyalin cartilage, and that probably excision of only the mobile portions is advisable.

CHESTER C. GUY, M.D.

Lindblad, M.: Local Growth Disturbances in Tuberculous Disease of the Knee Joint in Children. *Acta radiol.*, 1936, 17: 359.

In 11 cases of tuberculous gonitis in children ranging in age from 3 to 8 years the author noted, besides the classical signs of the disease—which in early cases consist merely in capsular changes and diffuse atrophy of varying degree—an increase in the length of the femur on the diseased side. The average difference in the length of the 2 femurs in the total number of cases was 8.5 mm. In 9 cases the tibia on the diseased side was also increased in length. The average difference between the 2 tibiæ was 3.8 mm.

From the situation of the "growth lines" the author concludes that the acceleration of growth must have been localized almost entirely to the growth centers about the diseased joint.

In all of the 11 cases a straightening out of the angle of the collum on the diseased side was observed. The widening averaged about 12 degrees.

The epiphyseal centers about the diseased joint were found enlarged to a varying degree. There was observed not only an increase in size with maintenance of the same shape, but also a varying degree of differentiation into a more advanced form on the diseased side.

In 2 of the cases there was retardation of growth at a more advanced stage of the disease.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Bonola, A.: Physiological Principles of Tendon Transplantation in the Treatment of Permanent Musculospiral Paralyses (Indirizzo fisiologico del trapianto tendineo nella terapia delle paralisi inveterate del radiale). *Chir. d. organi di movimento*, 1936, 22: 239.

Bonola presents a critical historical review of the various techniques for tendon transplantation in musculospiral paralysis, with formulas and diagrams and a table showing the excursion and work capacity of the muscles of the forearm and hand. He then reports 3 cases of irremediable musculospiral paralysis which were operated on at the Rizzoli Institute at Bologna. The palmaris longus and brevis or the longus alone was substituted for the extensors and long abductors of the thumb, and the flexor carpi ulnaris for the common extensors of the fingers. The permanent results in all of the cases were excellent.

The arrangement of choice in these transplantations is always that in which the tendon will have the shortest course and undergo the least angulation. Methods which, with the purpose of maximal restoration of extension to the wrist and fingers, superimpose various strata of transplants are inadvisable because of the risk of adhesions. For reasons of both co-ordination and function, the action of an antagonist should not be spread over too many paralyzed tendons.

In the choice of antagonists it is necessary to take into consideration for each transplant its work capacity in comparison with that of the muscle which it is to replace; its contraction curve in connection with its new function; the distance and course to its new insertion; and the static equilibrium of the hand in the lateral and flexion-extension planes. For work capacity, the optimum is approximation of the normal flexor-extensor relationship of 3 to 1, but in practice, especially in the restoration of extension of the fingers, this is very difficult. However, the author knows from experience that good results can be obtained even with a flexor-extensor relationship of 7 to 1.

For each muscle or group of muscles paralyzed there is an optimum transplant. For the extensors and abductors of the thumb, this is composed of the palmaris longus, and for the extensors of the fingers, of the flexor carpi ulnaris. Extension of the wrist is restored by transplants combined with shortening of the extensors and their tendons.

In view of numerous proofs that transplantation of antagonists may result in almost complete functional restoration of the hand, this method should be used for the great majority of irremediable musculospiral paralyses. The technique should be simplified to the extreme and the choice of antagonists varied according to the individual case. The operation should be reduced to substitution only for the muscles indispensable to good functioning of the hand (i.e., the extensors of the fingers and the abductor-extensors of the thumb), without impoverishing the flexor group too much. It should be preceded by physical therapy to correct the retraction of the flexor tendons and rigidity of the wrist, and the transplant should be mobilized early.

The article is accompanied by photographs and a bibliography. M. E. MORSE, M.D.

Mandl, F.: The Prophylaxis and Therapy of Postoperative Knee-Joint Infection. *Wien. klin. Wchnschr.*, 1936, 1: 577.

In 600 cases in which the author performed a meniscus operation there remained no complications which in any way impaired the functional result. However, among cases of knee-joint disease in which the primary operation was performed before the patient came under his observation there were 3 with postoperative complications. In 1, the complication was the presence of free joint mice with chondromalacia; in another, rupture of the crucial ligament with "irritation knee" which persisted for eight months; and in the third, anklyosis following a crucial and lateral ligament plastic operation. The result was poorest in the last case. The danger of infection of the knee joint must be considered from the viewpoint of the following facts and factors:

1. In the presence of a good outflow of lymph and blood, the possibilities of spread of the infection are increased.

2. The extensive synovial membrane is an excellent culture medium for bacteria.

3. The normal resistance of the knee joint to infection.

4. The possibility of localization of an infection by the borders of the crucial ligaments.

From these considerations the author concludes that local treatment is of great importance.

In operations on the knee joint strict asepsis is necessary. The incision is also of importance as the danger of infection increases with the time required for the operation and the extent of the tissue trauma. The incision of choice is the simple parapatellar incision with preservation of the muscles and lateral ligaments.

For timely recognition of a postoperative infection a bacteriologic study of any exudate that may be present is necessary. Constant observation of the blood picture is of great importance as the blood findings may suggest the presence of a septic process. The author does not differentiate between the so-called joint empyema and capsular phlegmon.

The treatment indicated for postoperative infections of the knee joint includes immobilization, aspiration, the injection of various antiseptics, drainage according to the method of Payr, and, in severe cases, parapatellar incisions followed by movement according to the method of Wilms or, possibly, amputation. All other operative measures usually interfere with joint function and sometimes are followed by ankylosis. Whether and when to amputate is very difficult to decide.

The author briefly discusses the so-called "irritation knee." This is essentially an inflammatory process following an open wound or an operative procedure on the joint. It is characterized by pain, redness, a slight increase in the temperature, and recurrent joint effusion. Slight infection may be present. As treatment, Mandl recommends rest and the application of moist dressings.

(HAAGEN). WILLIAM C. BECK, M.D.

FRACTURES AND DISLOCATIONS

Perkins, G., and Watson Jones, R.: Fractures in the Region of the Shoulder Joint. *Proc. Roy. Soc. Med.*, Lond., 1936, 29: 1055.

PERKINS discusses the importance of treating the soft parts along with, rather than after, a bone injury. He feels this is especially important in shoulder injuries in which the treatment of the soft parts is of far greater importance than the treatment of the bone. He is of the opinion that, in fractures close to the shoulder joint, splinting is unnecessary either to immobilize the fragments or to keep them in good position. The musculature is adequate for the first purpose, and malalignment of the upper end of the humerus gives rise to no great disability. In his opinion the most satisfactory treatment for shoulder-joint fractures is support with a sling and immediate treatment by a masseuse, with early active motion. He is strongly opposed to immobilization in an abduction splint.

WATSON JONES analyzes 571 cases of injury of the upper end of the humerus which were treated at the Liverpool Royal Infirmary in the period from 1929 to 1934. He states that isolated fractures of the great tuberosity without displacement are best treated by sling and active motion. In cases with displacement, the arm must be immobilized in abduction of 90 degrees and external rotation of at least 60 degrees until the patient can actively lift it from the support. Dislocations of the shoulder should never be treated by passive motion. If the dislocation is associated with avulsion of the supraspinatus, the arm should be put in an abduction frame as soon as the diagnosis is made, which is usually 5 or 6 weeks after the dislocation.

Fractures of the neck of the humerus may be divided into 3 groups: contusion crack fractures with no displacement, adduction fractures, and abduction fractures. Contusion crack fractures with no displacement should be treated by sling and active motion. Adduction fractures should be immobilized with the arm in abduction of 90 degrees. Abduction fractures frequently show little displacement and may be treated with a sling. If there is no impaction, reduction is necessary, but never abduction. Occasionally fracture dislocations may be reduced by manipulation, but frequently they require open operation. BARBARA B. STIMSON, M.D.

Welcker, E. R.: Fractures of the Tuberosities of the Humerus (Ueber Frakturen der Tubercula humeri). *Arch. f. klin. Chir.*, 1936, 184: 628.

Welcker reports in detail a case of bilateral isolated fracture of the lesser tuberosity of the humerus observed at the Greifswald Clinic, an injury which has not been previously described in the literature. In contrast to the isolated fracture of the greater tuberosity, the isolated fracture of the lesser tuberosity is an "indirect" fracture caused by a tear of the subscapularis muscle due to stretching. Welcker discusses the mechanics of its production in detail. In the reported case of bilateral fracture of the lesser tuberosity bilateral axillary nerve damage occurred. On anatomic grounds, the axillary nerve damage is to be considered a typical complication of fracture of the lesser tuberosity. In contrast to the pressure damage of the nerve in dislocations of the shoulder, the axillary nerve injury due to stretching of the subscapularis muscle is a tearing injury.

The author reports also on the fractures of the greater tuberosity which have been observed in the Greifswald Clinic in the last ten years. Such a fracture occurred in 12.9 per cent of 155 cases of shoulder dislocation. In the cases treated from the beginning at the Greifswald Clinic the results were considerably better than those in the cases which were first treated elsewhere. The poor results in the latter were due chiefly to failure to recognize the complicating injury early.

The prognosis of isolated fracture of the greater tuberosity is favorable. As a rule such fractures are produced by indirect violence. Occasionally, however, they may be the result of both direct and indirect force.

In discussing the symptoms and diagnosis the author calls attention to a sign not recognized heretofore which permits a probable diagnosis of injury of the greater tuberosity, viz., the impossibility of active outward rotation and severe pain on attempts at passive outward rotation with surprisingly free and almost painless inward rotation.

As treatment he recommends active motion as soon as possible.

Typical roentgenograms of the various types of injuries are presented.

(Welcker). Barbara B. Stimson, M.D.

Guazzieri, G.: Bennett's Fracture (Sulla frattura di Bennett). *Riv. di chir.*, 1936, 2: 292.

In 1882 Bennett described a fracture involving the base of the first metacarpal bone. This fracture occurs most frequently in persons engaged in heavy manual labor and in boxers. It is caused usually by a blow or fall on the head of the metacarpal bone while the thumb is in flexion. In rare instances it is produced by a pulling force. From experimental studies which he carried out to determine the mechanism of its production the author draws the following conclusions:

1. Bennett's fracture may be produced experimentally by a crushing blow imparted, for example, with a hammer of medium size on the head of the first metacarpal bone while the hand is solidly supported on the ulnar side and its base is violently thrown against the inferior articular surface of the greater multangular bone.

2. The force must be considerable because the metacarpal bone offers resistance before it fractures.

3. The best position in which to produce the fracture is abduction and medial extension of the metacarpal bone.

4. It is possible to produce Bennett's fracture always by the same mechanism even if, between the point where the trauma is inflicted and the base of the metacarpal bone, there is an intermediate articulation, provided, however, that the latter is well fixed and the thumb is on the line of abduction and slight extension in which the metacarpal bone has been placed. In this manner it has been possible to produce Bennett's fracture with a blow of the hammer on the tip of the thumb of a cadaver of middle age.

It is impossible to produce Bennett's fracture experimentally by pulling forces, by bringing the metacarpal bone into abduction and forced extension.

Bennett and others regarded osseous crepitation as of considerable importance in the differential diagnosis, but the author believes that this is not at all constant.

Another symptom is pain localized at the base of the anatomical snuff box. As a rule the fracture is easily differentiated from other fractures and dislocations in the same region. The clinical findings should always be controlled with roentgenograms.

The treatment should consist in immobilization and continuous traction maintained for from two to three weeks. Richard E. Somma, M.D.

Goetze, O.: Safeguarding the Restitution and Reconstruction of the Roof of the Acetabulum (Die Sicherung der Restitution und Rekonstruktion des Hueftpfannendaches). *60. Tag. d. deutsch. Ges. f. Chir.*, Berlin, 1936.

Follow-up examinations of patients with congenital dislocation of the hip reduced successfully by conservative methods have revealed an unexpectedly high percentage of poor end-results. Well known are the findings of the investigation which Lange reported at the German Orthopedic Congress in 1920. Similar disappointing results were found by Beck in follow-up examinations of patients treated at the Erlangen Clinic. In only one-eighth of the cases in which reduction was effected 5, 10, or 20 years previously did the roentgenograms show an anatomic cure. In the others it revealed disappearance of the roof of the acetabulum with subluxation which at first was slight but with increasing age became more pronounced or resulted in complete reluxation. Deformities of the head of the femur of all grades and arthrosis deformans were also found to increase with the duration of the period of observation. Of great importance is the fact that considerable anatomic malformations may not cause symptoms for years although they ultimately produce marked symptoms. In studies of patients treated at Bier's clinic, Beck found that even in those with a perfect anatomic cure the acetabulum may become flattened and subluxation with pronounced symptoms may occur during adolescence.

Even in the absence of a manifest congenital dislocation of the hip or the reduction of such a dislocation a flat acetabulum with an insufficient roof and anatomic and functional disturbances may be found in patients who, up to their fifteenth, twentieth, or twenty-fifth year of age were completely or almost completely free from symptoms and had no indication of hip disease during childhood. In such cases of vague hip disorders in adults, Fischer of the Erlangen clinic found malformations of the acetabulum surprisingly often. He described and analyzed in detail the lesser grades of flat acetabulum which previously has received little recognition.

These 2 series of observations show the great importance of the roof of the acetabulum, without which it is apparently impossible to obtain permanent asymptomatic function of the hip joint by either early conservative or operative treatment of congenital dislocation. In conservative treatment it was hoped, by early reduction, if possible before the end of the first year of life, and by long-continued after-treatment, to improve the poor results considerably. Because of the frequent failure of conservative measures, plastic operations on the roof of the acetabulum are being performed more and more often. Without doubt these efforts will

lead to considerable improvement of the end-results. Such improvement is already evident, for example, in the work of Schede.

Modern orthopedic endeavors therefore require, on the one hand, early diagnosis and, on the other, especially in neglected cases and those treated too late or unsuccessfully, certain formative powers of the body: (1) the power of functional adaptation which will respond to the stimulus of weight-bearing and movement with the formation of an acetabular roof capable of bearing weight, and (2) a reparative power following operative reconstruction of the roof of the acetabulum.

Under the conditions mentioned it may be allowable to subject the lesion and the treatment to a critical discussion based upon embryological laws and the information gained from general surgery.

What normal powers form the hip joint ontogenetically? Normally, the hip joint and the roof of the acetabulum are formed without participation of the functional stimuli of the body and its environment; therefore entirely by entelechy, the primary self shaping energy of the developing organism. In embryological life all of the tissues are so sensitive and vulnerable that mechanical influences which in later life act as functional stimuli may injure them severely (Jansen and Debrunner). After termination of the period of growth, from the eighteenth to the twentieth years of life, the formative powers of the body are controlled entirely by functional stimuli. Before then, that is, throughout the period of growth, the action of these stimuli is combined with that of the non-functional differentiating energies of the body. During the first decades of life, the latter gradually decrease.

Congenital dislocation therefore goes back to a primary defective anlage, an arrest of development, which perhaps even in favorable cases is responsible for an at least latent inferiority throughout life. The hip never becomes able to meet the demands of the upright position under all conditions. However, the defect is pathologic chiefly in the sense of retardation. There may be also cases in which the automatic formative power remains permanently entirely insufficient or permanently misdirected. The subsequent course of development in cases of reduced dislocation shows clearly that a normally directed, though retarded, purposive tendency in the development of the roof of the acetabulum is always evident. The retardation may be explained by the assumption that, after birth, the child retains for a longer or shorter period of time the peculiar and dangerous properties of the embryonic tissue with deficient power of resistance in its cartilaginous and bony pelvis to normal functional stimuli.

The author suggests that in the treatment of congenital dislocation of the hip an attempt be made to utilize this primary automatic formative energy, which is essentially independent of function and to a certain extent may at first be disturbed by functional stimuli. He believes it possible that the therapeutic problem may be solved by direct stimulation of this primary power of automatic differentiation (hormones and vitamins). He regards it as certain, at any rate, that the great sensitivity of the embryonic hip must be given considerably more consideration than it has received heretofore and that all stimuli of weight-bearing and movement should be excluded as completely as possible. The fact that reluxation can occur even when a plaster cast is applied correctly proves that a plaster cast does assure absolute immobilization. The frequent subsequent flattening of acetabulum shows that the formative functional balance is always disturbed by hyperfunction, and demonstrates the surprisingly slight power of resistance of the roof of the acetabulum.

If it is desired to prolong the period of automatic formation and the reciprocal differentiation of the head of the femur and the acetabulum artificially, this can be done only by complete elimination of all so-called functional stimuli and harmful influences. When the head of the femur cannot be replaced deeply by conservative means, the hip joint should be opened with care to prevent injury to the blood vessels entering behind the neck of the femur and supplying the head; the cavity of the acetabulum made capable of accommodating the head by careful and conservative removal of cartilaginous and connective tissue obstructions; and the head of the femur then re-inserted and fixed in such a way that the roof of the acetabulum can grow around it spontaneously without disturbance. In order that the hollow spherical shape of the primarily cartilaginous acetabulum may be formed perfectly, gliding movements of the femur from below upward must be prevented during the early weeks or months after the reposition. If, in the decisive early weeks after the reposition, the cartilaginous acetabulum, which unfortunately cannot be visualized in the roentgenogram, assumes an oval form, all of the prerequisites for sliding and thrust trauma of the regenerating acetabulum are provided by the slight gliding movements which can occur even under a plaster cast.

Goetze obtains firm fixation with the aid of a blunt-pointed nail which he introduces through the trochanter, the neck and head of the femur, and the acetabulum as far as the interior of the pelvis. This prevents dangerous sliding movements even without the use of a plaster cast, yet allows limited flexion and extension (ball-and-socket movements).

There are, of course, objections to this perforating nail, but on the basis of the findings in articular surfaces following arthrodesis with thick perforating bone splinters, the tendency toward permanent injury of the cartilage of the head of the femur as a whole may be estimated as being, in general, slight. However, the dislocated head with its lowered resistance may react differently. Under such conditions the nail must surround it. From the end-results in replaced congenitally dislocated hips we know that when the roof of the acetabulum is good the tendency toward deformity of the head of the

femur is generally slight. Another danger is that of stiffness which increases with advancing years. Nevertheless, in the case of a girl 7 years of age, who carried a nail for 4 months, this was relieved in a short time. Five months after the head of the femur was replaced deeply in the acetabulum small bone shadows became visible in the region of the future roof of the acetabulum, and today, about 11 months after the reduction, the bony roof of the acetabulum has developed to such an extent that the hope of an entirely normal form seems justified.

In conclusion the author states that subjective freedom from symptoms must never deceive us as to the threatening dangers. We should not await symptoms but should be always by on the alert to determine, by means of roentgenography, whether the prerequisities for the development of an anatomically normal hip joint are present. If this is not the case, energetic conservative or operative measures are indicated as all types of malformations denote a predisposition to the development of symptoms ultimately.

The retention aid described is applicable also in the most varied types of plastic operations on the roof of the acetabulum. In these, the nail may be of value to relieve the weight on the plastically introduced roof material during the time of bony consolidation and also to overcome the tendency toward subluxation of the head in the depth of the acetabulum. The author has used it several times in operations for congenital dislocation of the hip in older children and adults, but is not yet ready to report its results in such cases.

(GOETZE). LOUIS NEUWELT, M.D.

Campbell, W. C.: Posterior Dislocation of the Hip with Fracture of the Acetabulum. *J. Bone & Joint Surg.*, 1936, 18: 842.

Of 80 cases of posterior dislocation of the hip, a complicating fracture of the acetabulum was present in 30. Sixteen of the latter were recent cases and 14 were old. Campbell recognizes 3 types of such cases:

Type 1. In this type there is a fracture in the superoposterior aspect of the acetabulum of an irregular, more or less triangular piece of bone. The head of the femur is subluxated slightly upward and backward. Stereoscopic roentgenograms are essential to determine the exact location of the head. The deformity is not great. The subluxation is frequently unrecognized, distressing disability therefore resulting.

Type 2. The head of the femur is further displaced and the fragment from the acetabulum is pushed up a considerable distance. The deformity and disability are marked.

Type 3. In this type there is a complete dislocation of the head and the accompanying acetabular fragment with typical signs and symptoms.

In Types 2 and 3 the diagnosed should be obvious. The mechanism of injury is usually force applied from below with the hip flexed, as in a automobile collision when the knee strikes against the instrument board. The treatment in fresh cases is immediate reduction followed by immobilization in plaster with the hip in slight hyperextension and abduction. Active and passive motion are started in the bivalved cast at the end of three weeks and walking with crutches at the end of six weeks. Walking without support is begun at the end of ten or twelve weeks.

Of the 16 fresh cases reviewed, 6 were of Type 1, 6 of Type 2, and 4 of Type 3. Open reduction was done in 3 cases. Of the 13 other cases, excellent results were obtained in 6. In 1 case the result was poor, and in 2 cases the treatment was given too recently for the result to be known. Four patients cannot be traced. Of the 14 cases with old dislocations, open operation was done in 8. Three types of operations were performed: (1) open reduction with reconstruction of the acetabulum; (2) partial arthroplasty; and (3) complete arthroplasty. The end-results were far from satisfactory. In all these cases fusion was recommended but refused.

Illustrative roentgenograms accompany the article. BARBARA B. STIMSON, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Theis, F. V., and Freeland, M. R.: Peripheral Circulatory Diseases. *J. Am. M. Ass.*, 1936, 107: 1097.

Alternating positive and negative pressure treatments are of definite clinical value in the treatment of peripheral circulatory diseases. However, the skin-temperature changes are not significant enough to explain the superiority of this procedure on the physiologic basis of increased circulation of blood. More consistent and higher elevations of the skin temperature can be produced by vasodilatation brought about by the application of direct or reflex heat. However, these measures are less effective in causing clinical improvement than pressure treatments. The difficulty in explaining the better clinical results from pressure treatments suggested a study of the changes in the oxygen-carbon dioxide relation in the venous blood of the extremities.

The study was made to determine the effect of heat and pressure treatments on the peripheral circulation. The following program was carried out on 25 patients who were suffering from various types of peripheral circulatory disease or were used as controls:

1. Skin-temperature readings were taken under controlled conditions before and after all treatments.

2. Oxygen-carbon dioxide analyses were made of the venous blood of the extremities before and after one-hour treatment with: (a) alternating positive and negative pressure to both lower extremities and the application of 45 degrees C. of heat to the upper extremities; (b) alternating positive and negative pressure to both lower extremities; (c) the application of 45 degrees C. of direct heat to both upper or both lower extremities; and (d) the application of 45 degrees C. of heat to the upper extremity for the reflex effect on the lower extremity.

3. Total metabolism tests and determinations of oxygen consumption per minute were made before and after one-hour treatments with alternating pressure to both lower extremities and the application of heat to both upper extremities.

Two hundred and eighty-seven oxygen-carbon dioxide determinations were made on 73 specimens of venous blood. Forty-eight total body metabolism tests were made by the Tissot open method to determine changes in the total consumption of oxygen and the elimination of carbon dioxide after one-hour treatments. Temperature readings were made with a Tycos dermotherm. The complete results are recorded in 8 tables. These include the oxygen-carbon dioxide capacity and content of the venous blood, changes in the peripheral temperature readings, the amount of perspiration, and the total number of treatments.

After discussing the results from each of the 4 forms of treatment the authors draw the following conclusions:

Correlation of the results of this study has provided a physiologic basis for treating peripheral circulatory diseases with alternating change in environmental pressures.

Alternating pressure treatments affect primarily the oxygen-carbon dioxide exchange in the tissues. This oxidation process may account for increased skin temperatures. Expecially in the presence of organic occlusive disease, there is little evidence that the circulation is increased.

Vasodilatation produced by direct heat or reflex heat is more effective in increasing the peripheral circulation, but apparently has little effect in augmenting the oxygen-carbon dioxide exchange in the tissues. The increased circulation merely increases the adequate oxygen supply that is still available.

The combination of reflex vasodilatation with pressure treatments is of distinctly more value than either measure alone. The vasodilatation produces a maximum increase in the circulation, and the pressure treatments augment local tissue metabolism. The resulting greater utilization of increased oxygen supply seems to be the basis for the superiority of this form of combined treatment.

Because of the natural progress of most peripheral circulatory diseases, the permanence of the improved circulation and local tissue metabolism cannot be determined. It is advisable to keep the improvement in circulation in advance of the pathological process.

Simonds, J. P.: Chronic Occlusion of the Portal Vein. *Arch. Surg.*, 1936, 33: 397.

In reporting a case of chronic occlusion of the portal vein by an old organized and canalized thrombus, the author states that there have been few articles in English on this condition. The occlusion is rarely diagnosed clinically, usually being mistaken for cirrhosis of the liver, Banti's disease, or ulcer of the stomach. In the author's case an unsuspected and unusual collateral circulation defeated the anticipated result of splenectomy, which in any other case would have been the logical treatment. The exceedingly unusual and unsuspected collateral circulation, which was so adequate that ascites never developed, was by way of huge varicose venous connections between the splenic and the left renal vein. Removal of the spleen and ligation of the splenic vein blocked the only open channel through which blood from the stomach and the intestinal tract could return to the general circulation. At postmortem examination, the normal lumen was found to end abruptly 1 cm. above the origin of the

portal vein. Serial transverse sections through the hepatoduodenal ligament upward to the hilus of the liver demonstrated that the portal vein was replaced by a few small channels up to 3 mm. in diameter.

Acute complete thrombosis of the portal vein usually progresses rapidly to a fatal termination from infarction of the small intestine. Chronic occlusion of the portal vein runs a much longer course, up to twenty years or more. The changes in the portal vein range from transformation into an impervious fibrous cord, often with calcification, to replacement by an angiomatous or cavernous mass the size of a goose egg.

Simonds discusses chronic occlusion of the portal vein on the basis of the case he reports and 94 cases which he collected from the literature. He states that the condition is about twice as frequent in men as in women. The most common symptoms and physical signs are ascites, abdominal pain, hematemesis, and a palpable spleen. The chief causes of death are hemorrhage and infarction of the intestines.

Since the work of Cohnheim and of Welch, alterations in the composition of the blood, slowing of the blood flow, and injury of the lining of the vessel have been accepted as the fundamental factors in the causation of thrombosis in general. In thrombosis of the portal vein these factors play a part in several ways. In at least 4 of the cases reviewed polycythemia was present. Kratzeisen and Gruber expressed the opinion that increased viscosity of the blood associated with polycythemia may be a factor in thrombosis. Changes in the blood flow may result from intrahepatic obstruction, mechanical pressure from enlarged lymph glands, and carcinoma of the head of the pancreas. Syphilis is considered an important etiologic factor in thrombosis of the portal vein. The syphilitic lesion of the vein may be degenerative and affect the media, or may be exudative and involve the other coats of the vein. Numerous secondary changes in the portal vein that may influence thrombosis are chiefly the results of infection, but trauma is apparently a causative agent in some cases. The frequency with which appendicitis leads to thrombosis of the portal vein is emphasized. Puerperal and other infections of the female genital tract have been regarded as etiologic factors. In the case reported by the author the patient had an abortion and an operation for pyosalpinx eight years prior to death and six years before the onset of symptoms. Simonds believes that the extension of an inflammatory or neoplastic process to the portal vein from surrounding structures is a factor in many cases.

On the basis of the nature of the lesion in the portal vein he divides the reviewed cases into 2 groups. In one group the vein was reduced to a fibrous cord with relatively slight canalization. In the other, it had been replaced by an elongated mass of spongy, cavernous tissue in which traces of the wall of the vein were usually, though not always, discernible. The majority of those who have studied this condition believe that it is merely the result of organization of a thrombus with marked recanalization. Others consider the lesion a congenital malformation. Pick expressed the opinion that the condition is a neoplasm—an angioma or cavernoma of the hepatoduodenal ligament.

The most constant accompaniment of chronic occlusion or stenosis of the portal vein is enlargement of the spleen. Changes in the liver are not so extensive or so frequent as might be supposed.

In 5 of the reviewed cases splenectomy was performed. One of the patients subjected to this operation survived for seven years. The infrequency with which the spleen is removed in this condition is surprising as splenectomy would seem to be the logical treatment. It reduces the burden on the collateral circulation usually by about one-fifth, and when the spleen is greatly enlarged, probably more. When the collateral circulation has become so incompetent that rapidly increasing ascites develops or when the esophageal varices have become so large as to be the source of frequent and copious hemorrhage the patient will survive for a period of from only a few months to two or three years.

HERBERT F. THURSTON, M.D.

Tomasi, L.: A Contribution to the Pathology and Clinical Features of Thrombophlebitis of the Upper Extremity (Contributo alla patologia e alla clinica delle tromboflebiti dell'arto superiore). *Arch. ital. di chir.*, 1936, 43: 525.

After briefly reviewing the factors which are thought to play a rôle in the development of thrombophlebitis of the upper extremity, the author reports a case in which a thorough pathological study of the amputated arm was made and autopsy was performed. The patient was a male farmer forty-five years of age who entered the clinic December 27, 1934. In 1918 he had had an attack of influenza associated with a gastro-intestinal disturbance which persisted for some time. For about one year he complained of a heavy sensation in the left hypochondrium which was thought by his physician to be related to enlargement of the spleen. Slightly more than one month before his admission to the clinic he noted a more or less sharp pain in the left flank and lower thorax on the left side which was exaggerated by breathing and coughing. There was no fever. The condition cleared up within a few days. Shortly afterward he suffered an abrasion of the right hand which healed promptly. About one week before his admission to the clinic he noted a series of vague symptoms to which he at first paid little attention. There was no history of trauma or undue force at any time. In the beginning there was an indefinite sense of difficulty in the left arm followed soon by indefinite pain localized in the upper part of that arm. This sensation extended gradually to the subclavicular, the upper pectoral, and lower cervical regions. The entire upper extremity then felt so heavy that it could not be used

as well as formerly. Although there was no fever a slight generalized weakness developed. During the next two or three days the pain not only became so severe in the original site that it forced the patient to stop work, but extended to the entire left extremity. At this time some swelling and change in color of the extremity were noted. The symptoms then became more rapidly progressive with the development of diffuse swelling of the entire extremity to the point where the skin was tight, translucent, and somewhat cyanotic, especially in the distal portions. The sensibility of the entire extremity gradually decreased.

On physical examination when the patient entered the clinic the arm was found abducted about 45 degrees, the elbow semiflexed, the hand prone, and the fingers flexed. The size of the extremity was increased by a diffuse swelling of cylinder-like proportions. The circumference of the extremity was uniformly about 3 or 4 cm. greater than that of the opposite normal extremity. The swelling extended to the base of the neck and the clavicular, pectoral, and upper scapular regions. The skin was tense, translucent, edematous, and decidedly cyanotic. The peripheral temperature was found to be moderately decreased. The radial pulse was easily perceptible.

A diagnosis of probable spontaneous primary lesion of the large vein of the upper extremity was made and the patient put to bed. For about seven days there was no change in the general or local condition. Then began a gradual decline with fever, increased respirations, deepening of the local cyanosis, diminution of the arterial pulse, loss of sensibility of the extremity, bullæ formation, and evidence of necrosis. Because of the progressive nature of the lesion disarticulation of the shoulder was performed on the twelfth day. Two weeks later the patient died of multiple pulmonary emboli.

Pathologic examination of the amputated upper extremity revealed all the evidences of gangrene, which were most marked distally and gradually decreased toward the proximal regions. The arteries appeared normal. The changes were most definite in the veins, both superficial and deep. The entire brachial and lower axillary veins and their branches, both deep and superficial, were occluded by a continuous thrombus. There was a massive occlusion of the entire venous system of the entire upper extremity. A diffuse lymphocytic infiltration of all the tissues was noted. In sections of the thrombi and tissues especially stained for bacteria numerous staphylococci and diplococci were seen.

The author describes the findings at autopsy in detail. Of most importance were thrombosis of the inferior vena cava and its branches, pulmonary embolism, and empyema.

On the basis of the findings in this case he attempts to clarify some of the many problems associated with the condition. He states that gangrene of purely venous origin is uncommon.

A. Louis Rosi, M.D.

BLOOD; TRANSFUSION

Hesse, E.: The Nature and Treatment of Hemolytic Shock After Blood Transfusion in the Light of Experimental and Clinical Investigation (Ueber das Wesen und die Behandlung des haemolytischen Shocks nach Bluttransfusion im Lichte experimenteller und klinischer Forschung). *Beitr. z. klin. Chir.*, 1936, 163: 390.

Bogomolatz, Bajdasaroo, Vlados, and others do not recognize hemolytic shock as a distinct entity, but classify all complications following blood transfusion as colloidoclasia. Hesse and his school subdivide such complications into 4 groups: (1) nonspecific protein reactions of varying intensity, (2) hemolytic shock and its sequelæ, (3) intoxication of the organism by denatured proteins occurring in preserved blood, and (4) anaphylactic shock.

Hemolytic shock still holds first place despite the great increase in knowledge regarding iso-agglutination. By means of experiments, Hesse was able to prove that hemolysis of the erythrocytes liberates depressor substances which act directly on the walls of the blood vessels. Sequelæ of the action of these substances are vessel spasms, dilatation of the capillary network, vascular engorgement, and a fall in the blood pressure. The second phase is brought about by spasm of the renal arteries. The toxic products liberated from the erythrocytes cause disturbances of kidney function.

Altogether, 217 cases of hemolytic shock have been recognized: 60 in Germany, 59 in Russia, and 38 in North America. The actual number is probably much greater. Hesse observed the occurrence of hemolytic shock in 6 (¼ per cent) of 2,360 transfusions. The final result was recorded in only 200 cases. In the latter there were 105 deaths, a mortality of 52.5 per cent. However, in 16 cases the treatment was that recommended by Filatov. If these are subtracted the mortality was 56 per cent. The cause of hemolytic shock is generally a difference in the blood groups. Schiff believes that a mistake in the blood-grouping is always the cause. However, there are exceptional cases in which it occurs when the blood groups are alike.

Hesse considers donors of Group o as belonging to a dissimilar blood group. In 46 cases in which a universal donor was used there were 20 deaths from shock. Hemolytic shock developed readily when quantities exceeding 200 c.cm. were transfused, when there was severe anemia (an erythrocyte count less than 2 million), and when the titer of the donor's serum to the erythrocytes of the recipient was high (above 1:32). Of the cases of patients belonging to Group A, the titer was high in 42.3 per cent, and of those of patients belonging to Group B, it was high in 32.7 per cent.

Shock may occur also when the plasma is dissimilar although there is a universal plasma (AB). Theoretically, failure to recognize subdivisions A_1 and A_2 may result in shock, but in practice this is of little importance. In the use of preserved blood, hemolysis may occur: (1) if the blood has been

preserved for a long time, (2) if it is heated to from 42 to 44 degrees, and (3) if denatured proteins are formed. Under such conditions amaurosis and severe disturbances of consciousness result. So far, hemolytic shock has occurred in 20 cases in which preserved blood was used. In 10, the blood was incompatible, and in the other 10 the condition of the blood was at fault.

Hesse differentiates 3 forms of hemolytic shock. The first is the acute form with mild vascular and cardiac phenomena which soon disappear. In this form about 50 c. cm. of hemolyzed blood can be taken care of by the reticulo-endothelial system. The second form is acute and severe, with a serious fall in the blood pressure. In 4 of the author's cases of this type death occurred within an hour, and in 24 cases within a few hours. In some of the cases the chief sign was increased bowel peristalsis. The third form of hemolytic shock described by Hesse is a late form in which the first signs appear after from twelve to twenty-four hours. This form is very infrequent.

Hesse rejects the theory that shock may be caused mechanically by embolic occlusion due to agglutinated erythrocytes. He believes it is due rather to an intoxication (also central damage) by fibrogen, albumin, globulin, and substances which belong to the adenosin phosphoric-acid group (Petrov).

He makes the following practical suggestions:

1. The kidney function should be determined before every transfusion.

2. During anesthesia the blood pressure should be watched constantly. Every decrease spells danger.

3. The biologic test of Oehleker should be made before every transfusion.

4. Pain in the loin should be regarded as very significant.

The only successful treatment of hemolytic shock after renal decapsulation, renal denervation, and other measures have failed is the transfusion of compatible blood as is done by Filatov and Hesse. The result is surprising even after small quantities have been transfused, but it is better to give from 200 to 300 c. cm. for the purpose of detoxification. The pain in the loin ceases promptly. The new transfusion should be given as soon as possible, but may be successful after 24 or even 48 hours. In 16 cases treated in this manner there were only 2 deaths. In 1 of the fatal cases there was insufficiency of the reticulo-endothelial system after removal of the spleen. In the other, the transfusion was given too late, on the sixth day. The transfusion of compatible blood is successful also in intoxication due to the products of protein decomposition in preserved blood. In cases of hemoglobinuria and anuria the intravenous injection of glucose is indicated. (Franz). Philip Shapiro, M.D.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE; POSTOPERATIVE TREATMENT

Mach, R. S., and Sciclounoff, F.: The Treatment of Hypochloremia and Pre-Operative Rechlorination (Le traitement des hypochlorémies et la rechloruration préopératoire). *J. de chir.*, 1936, 48: 342.

The authors studied the variations in the level of the blood chlorides, the urinary excretion of chlorides, alkali reserve, and blood and urinary urea in cases of persistent vomiting and diarrhea and other conditions causing hypochloremia. They found that the injection of a hypertonic solution of sodium chloride is followed by an immediate, but very brief, elevation of the blood chloride and by no increase in excretion of chloride in either the urine or the stools. They therefore conclude that the chloride injected becomes fixed in the tissues. If injections of hypertonic saline solution are continued daily, the blood-chloride level can be raised gradually in a ladder-like fashion until finally the normal level is reached. As soon as the normal level is reached excretion of chloride occurs in the urine.

The authors report the findings in 4 cases in detail. They state that the modifications in the partition of globulin chloride to plasma chloride are of no value in determining the degree of rechlorination. They recommend either repeated daily injections or continuous drop-by-drop injection of a hypertonic solution of sodium chloride. To determine if rechlorination is sufficient, the plasma chloride level should be determined. If this is impractical, the urinary excretion of chloride should be studied. When the chloride content of the wine rises to the normal level, rechlorination is complete.

MAX M. ZINNINGER, M.D.

Stewart, J. D.: Fluid Therapy in Surgery: A Critical Review. *New England J. Med.*, 1936, 215: 53.

The body fluids occupy 3 reservoirs: blood vessels, interstitial areas, and cells. These fluids have a salt content which must be kept constant. The 3 most important factors to be considered in derangements of the body fluids are: (1) the total amount of the fluid; (2) the concentration of salts; and (3) the acid-base balance. It is the function of the kidney to regulate these factors.

The plasma proteins constitute another factor. It is due to the osmotic pressure of these colloid substances that fluid is kept within the capillaries in balance against the force of the blood pressure. The normal level of plasma proteins ranges from 6.5 to 7.5 per cent. If the level falls to below 5 per cent edema may result.

Fluid therapy may be given:

1. By mouth. In most cases the administration of fluids by mouth is adequate, but in certain conditions, such as functional or organic derangements of the gastro-intestinal tract, urgent conditions, hemorrhage, and shock, it may be advisable to employ other routes.

2. By rectum. Water and physiologic salt solution may be absorbed from the colon in large quantities when introduced through the rectum, but experimental evidence shows that glucose is not absorbed from the colon although variable quantities may be absorbed from the terminal ileum after it has passed the ileocecal valve. Glucose has the disadvantage that it may undergo fermentation in the colon and produce irritation leading to expulsion of fluid given subsequently. No hypertonic solutions should be given by proctoclysis in dehydration. If glucose is administered by this method it should be in a 5 per cent solution.

3. By hypodermoclysis. This is one of the most useful methods in fluid therapy. The fluid must be sterilized and given with an aseptic technique. Sodium bicarbonate solution, the most concentrated glucose solutions, and blood cannot be given by hypodermoclysis.

4. By intraperitoneal injection. Physiologic salt solution, a 5 per cent glucose solution, Ringer's solution, and even whole blood may be administered by this method. However, intraperitoneal injection should be used only rarely as it is associated with the danger of infection and traumatization of the viscera and peritoneum.

5. By intravenous infusion. This is one of the most valuable methods. A large variety of fluids may be administered by vein. Hypertonic or hypotonic solutions may be used.

The types of fluids employed in fluid therapy are:

1. Physiologic salt solution. This has a 0.9 per cent content of sodium chloride. Sodium chloride is indispensable for the correction of dehydration.

2. Glucose solution. After its injection into the blood stream glucose is rapidly taken up by the liver and muscles and converted into glycogen or oxidized within a few hours. Its water of solution is then eliminated by the kidneys. The diuretic effect is much to be desired in the oliguria of dehydration.

3. Glucose in physiologic salt solution. The intravenous injection of a 2.5 per cent, 5 per cent, or 10 per cent solution of glucose made up with a 0.9 per cent content of sodium chloride may be useful as it supplies water, glucose, and sodium chloride.

4. A 50 per cent sucrose solution. This is better than glucose solution to lower intracranial pressure as it does not diffuse into the cerebrospinal fluid.

5. A 5 per cent solution of sodium bicarbonate. This is of value in the treatment of severe acidosis with dehydration.

FLUIDS USED IN FLUID THERAPY AT MASSACHUSETTS GENERAL HOSPITAL

Fluid	Nature	Method of administration	Indications	Dosage first 24 hours per kilogram body weight (c.cm.)
0.9% sodium chloride (physiologic salt solution)	Isotonic; neutral reaction; *in vivo* yields relative excess of chloride	Proctoclysis Hypodermoclysis Intravenous infusion	Dehydration with or without alkalosis or acidosis	50-100
5% glucose solution	Istonic; neutral reaction; *in vivo* yields free water	Proctoclysis Hypodermoclysis Intravenous infusion	Oliguria of dehydration Ketosis Carbohydrate-lack	40-80
5% glucose solution with 0.9% sodium chloride	Hypertonic; neutral reaction	Intravenous infusion	Dehydration Ketosis	50-100
10% glucose solution	Hypertonic; neutral reaction	Intravenous infusion	Ketosis, severe Carbohydrate-lack	20-40
50% sucrose solution	Hypertonic; neutral reaction	Intravenous infusion	Increased intracranial pressure	5-10
5% sodium bicarbonate solution	Hypertonic; alkaline	Intravenous infusion	Severe acidosis, supplementary to 0.9% NaCl	5-10
1.8% sodium lactate solution	Isotonic; neutral *in vitro;* produces alkali *in vivo*	Hypodermoclysis Intravenous infusion	Severe acidosis, supplementary to 0.9% NaCl	10-20
6% acacia in 0.9% sodium chloride	Isotonic; osmotic pressure of colloids similar to that of plasma proteins	Intravenous infusion	Shock and hemorrhage (temporary substitute for transfusion)	10-20
Blood, whole or with 0.25% sodium citrate		Intravenous infusion	Hemorrhage Shock Chronic anemia Deficient plasma proteins Acute and chronic infections Hemorrhagic disease	10-20

6. A 1.8 per cent solution of sodium lactate. Hartmann has advocated the use of this fluid as a substitute for sodium bicarbonate solution. It has the advantages of being isotonic and neutral. Its alkalinity is due to the gradual conversion of the lactate to glucose in the body.

7. Acacia solution. This consists of 6 per cent gum arabic in a 0.9 per cent sodium chloride solution. Acacia forms a colloidal solution which leaves the blood stream very slowly and therefore tends to hold fluid in circulation. It has a limited usefulness in the treatment of conditions with acute reduction of the blood volume, such as shock and hemorrhage, when blood transfusion cannot be done immediately.

8. Blood. Whole unmodified or citrated blood from a compatible donor may be injected in quantities ranging from 400 to 1,200 c.cm.

Dehydration occurs when the intake of water and salts is insufficient or there is an abnormal loss of body fluid. It may be accompanied by acidosis or alkalosis. Loss of acid gastric juice leads to dehydration with alkalosis, and loss of upper intestinal secretions to dehydration with acidosis. The degree of dehydration may be estimated from the patient's facial appearance, the degree of thirst, and the dryness of the buccal mucosa, tongue, and skin. In the absence of diabetes insipidus or mellitus and of severe nephritis a daily output of over 1,500 c.cm. of urine with a specific gravity below 1.015 is strong evidence of the absence of dehydration. In the presence of conditions tending to cause dehydration, elevation of the urea nitrogen of the blood above 30 mgm. per cent or of the non-protein nitrogen above 40 mgm. per cent is evidence of advanced dehydration. Changes in the plasma bicarbonate and chloride from their normal values may be regarded as indirect evidence of dehydration.

The fluids found satisfactory in fluid therapy on the Surgical Services of the Massachusetts General Hospital, Boston, are listed in a table. The dosage recommended in this table is only approximate as there is a wide variation in the amount required in different cases. ALTON OCHSNER, M.D.

ANESTHESIA

Livingstone, H., Davies, M. E., and Morgan, M.: Anesthesia in Neurosurgical Operations. *Anes. & Anal.*, 1936, 15: 169.

This article is based on 791 cases in which 1,080 neurosurgical operations were performed.

The authors state that with the patient in the sitting position there is an unavoidable slumping, the danger of aspiration is increased, and frequently a marked drop in the blood pressure occurs. Signs of collapse may be noted as soon as the patient, especially the conscious patient, is placed in this position. Immediate relief when the patient is lowered to the horizontal position indicates that these signs are due to cerebral anemia. Of the cases reviewed, signs of syncope were less frequent in those in which morphine-scopolamine-novocain anesthesia was induced than in those with anesthesia of other types.

In frontal and frontotemporal operations the supine position increases the danger of aspiration and renders it difficult for the anesthetist to reach the eyes, nose, and mouth. In the temporal operations performed in the reviewed cases the shoulder was propped up and the head elevated and turned to reduce the danger of aspiration.

Avertin is given in doses of from 80 to 95 mgm. per kilogram of body weight, or less in the cases of patients in poor condition. It is not employed in the presence of disease of the lungs, liver, kidneys, or lower bowel. The use of avertin is one of the simplest methods of inducing anesthesia for neurosurgical procedures. The authors have found it more satisfactory than the rectal administration of ether and oil.

Oxygen under pressure must be available for instant use in the event of respiratory failure, and a patent air-way must be maintained at all times. Following severe hemorrhage, artificial respiration may be necessary to maintain life until a blood transfusion can be given. The authors cite a case in which the patient was kept alive by this means for 45 minutes, until normal respiration was re-established.

The use of adrenalin to control hemorrhage is avoided by the authors as it has been followed by alarming drops in the blood pressure. The blood pressure may fall with the elevation of a bone flap, the use of the electric cautery, the removal of a tumor, hemorrhage, or a gradual loss of body fluids. As a rule, though not always, the pulse rate is increased.

In the cases of patients with increased intracranial tension the use of narcotics is inadvisable because of the frequency of respiratory difficulty. Respiratory difficulty is most apt to occur when there is manipulation or disease near the respiratory center.

Postoperative observations support the claim of Mathes and Holman that the formation of thick tenacious mucus, the probable cause of massive collapse of the lungs, is favored by the pre-operative administration of atropin. In the reviewed cases other pulmonary complications were also more frequent following the use of atropine, morphine, or scopolamine, especially when these drugs were given before the induction of ether anesthesia.

Except in the cases in which there was sufficient pressure to cause respiratory embarrassment, ether added no more risk than novocain when abolition of consciousness or of restlessness was required.

Avertin combined with novocain seems to be the most satisfactory anesthetic for adults except when it is necessary to be able to arouse the patient. For children, ether used alone is the anesthetic of choice.

EDWARD S. PLATT, M.D.

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Kelly, J. F., and Dowell, D. A.: The Present Status of the X-Rays as an Aid in the Treatment of Gas Gangrene. *J. Am. M. Ass.*, 1936, 107: 1114.

Complete and rapid recovery in a case of gas gangrene involving a lower extremity which was treated by roentgen irradiation in 1928 led the authors to apply similar treatment to 7 additional cases referred to them in the following three years. Five of these, with involvement of an extremity, responded in the same startling manner. The authors believe that in the 2 others, in which the trunk was involved and death resulted, the rays employed were of insufficient penetrating power. Serum treatment was given simultaneously in all of the cases.

In the next three years 2 more cases were treated by the method described and data on 30 others treated elsewhere in a similar manner were collected. Of this series of 32 cases, serum was administered in 30. Of 8 patients with trunk involvement, all recovered. Of the 24 with involvement of an extremity, amputation was done on 11. Of the latter, 5 died. Two died of causes not directly attributable to the gas gangrene. The 3 others who died probably received insufficient roentgen therapy. Of the 13 patients with involvement of an extremity who were not subjected to amputation, all lived.

Encouraged by the results obtained from the use of roentgen rays as an aid in the treatment of gas-bacillus infection, the authors sent a questionnaire regarding this treatment to radiologists and surgeons throughout the country. In reply they received data on 16 additional cases. All of the 16 patients lived. Five of them received no serum and only 2 had an amputation.

Of the total number of 56 patients whose cases are reviewed, only 5 (8.9 per cent) died of gas-bacillus infection. This mortality rate compares favorably with that in any series of cases of gas-bacillus infection so far reported in the literature. The results seem to the authors to justify the conclusion that roentgen irradiation is of definite value as an aid in the treatment of gas-bacillus infection and should be used in all cases. It appears that amputation, when necessary, should be postponed until the patient has recovered from shock and the gas-bacillus infection. The use of serum is regarded as advisable.

The roentgen technique recommended is the administration of treatments morning and evening for at least three days with sufficient voltage to insure penetration of the involved tissue—from 90 to 100 kv. on an extremity with filtration by 1 mm. of aluminum; from 130 to 160 kv. on the trunk with increased filtration; and about 100 r per treatment over each area. ADOLPH HARTUNG, M.D.

Meyerding, H. W.: Roentgen-Ray Therapy of Bone Tumors. *J. Bone & Joint Surg.*, 1936, 18: 617.

Although all tissue is radiosensitive to some degree, it has been found that some tumors, such as osteogenic sarcomas, are comparatively resistant or insensitive to irradiation whereas others, such as endothelial myelomas, are so remarkably sensitive that irradiation is of aid in their diagnosis.

Not all tumors are amenable to surgical treatment and certainly not all are radiosensitive enough to be considered amenable to treatment with the roentgen rays. In certain cases, a combination of surgery and irradiation is more beneficial than either method alone. In others, especially those of benign tumor, surgery cures quickly and surely, in minimal time, and permits microscopic study of tissue with consequent verification of the clinical, roentgenographic, and surgical diagnosis. A claim of cure from irradiation without microscopic proof thereof is not always tenable. Members of the medical profession look to the teamwork of the family physician, surgeon, roentgenologist, and pathologist to bring about advances in knowledge from which earlier diagnosis, efficient treatment, and an increased number of cures may be expected. To this end the rôle of the family physician is probably most important for if the patient is treated for rheumatism or sprain until the tumor has become obvious, valuable time will be lost and treatment of any type will be less effective.

The pre-operative application of irradiation has recently been the subject of considerable discussion and has gained acceptance in some medical centers The author believes that its field of usefulness is very limited and its indiscriminate use may be more harmful than beneficial. What is needed is early diagnosis, destruction or removal of the tumor, and the prevention of metastasis. On the basis of his observations Meyerding is unable to recognize the value claimed for irradiation preceding biopsy or for routine irradiation of malignant tumors before amputation or excision. Although such treatment may give the roentgenologist an idea as to the radiosensitiveness of the tumor, the temporary improvement following it gives the patient a sense of false security and as the result exploratory operation may be postponed and the advantages of early and accurate diagnosis, immediate surgical treatment, and examination of tissue by a pathologist may be lost.

Postoperative irradiation has been employed following biopsy, excision, curettage, and amputation in the hope that any malignant cells remaining may be destroyed, that metastasis may be prevented, or that unrecognizable metastasis may be dealt with adequately. The beneficial effects of this form of treatment are due partly to the action of the rays on the blood vessels and the formation of connective tissue. The malignant cells which remain become

enclosed in masses of fibrous tissue with a poor blood supply, their growth being thereby inhibited. Delay of recurrence may be explained in this manner in some cases, but the author has seen malignant cells at the site of previous operation and extensive irradiation in cases in which clinical manifestations of tumor were absent. Postoperative irradiation may be one of the factors responsible for the greater number of 5-year cures recorded today than formerly, but in Meyerding's opinion an equally important factor is earlier diagnosis which permits efficient treatment.

The response to irradiation will usually be determined by the predominant type of cell. A certain type of tumor may vary in the degree with which it reacts; it may be wholly or only partially destroyed. There is a difference between the radiosensitiveness of tissues and cells of normal structures and the radiosensitiveness of tumors. A mixed-cell tumor with a great proportion of radiosensitive cells will for a time retrogress rapidly under treatment by irradiation, but after these cells have been destroyed, the remaining, more resistant cells will continue to grow and will not be affected by continuation of the treatment. Roentgenograms should be taken from time to time to visualize the effects of the irradiation.

Benign osteogenic tumors are those commonly known as exostoses, osteochondromas, chondromas, and fibromas. They are relatively insensitive to irradiation. As they are readily cured by surgical operation, treatment by roentgen rays has received little attention. For cases in which there is doubt as to the malignant transformation of a tumor of this group, the author favors excision and postoperative irradiation. He states that the tumor must be entirely removed, especially if it is a chondroma, and that if its complete eradication is doubtful, the actual cautery should be employed.

There has been considerable difference of opinion as to the relative merits of surgical operation and irradiation for the treatment of benign giant-cell tumors. Because of their situation or size, and the danger of hemorrhage and infection, some of them cannot be treated by surgery. For such tumors irradiation is advisable. Considerable judgment is required to determine the most advantageous form of treatment. The author cannot agree with those who believe that radiotherapy has solved the problem. It is well to remember that the roentgenographic characteristics of benign giant-cell tumors do not always positively prove the absence of malignancy, whereas if operation is performed, the opportunity is afforded for microscopic examination of frozen sections of tissue while the surgeon is at work.

Hemangioma affecting bone is moderately radiosensitive and under moderate dosage, repeated at regular intervals for a number of months, gradually regresses until healed.

Hemangio-endothelioma is less radiosensitive than endothelioma or hemangioma and tends to improve temporarily under irradiation.

Endothelial myeloma is the most radiosensitive of bone tumors, and completely regresses under irradiation competently applied. So uniform is its response to irradiation that diagnostic irradiation has been advocated and is considered sometimes to be more reliable than the opinion of the average pathologist. While the tumor and symptoms may disappear under treatment and the bone may assume a normal appearance, the treatment often fails to effect a cure because of metastasis. Early radiotherapy, before metastasis has occurred, may result in permanent cure. Opinion recently appears to favor amputation, irradiation, and the administration of Coley's toxins.

Osteogenic sarcomas, as a group, are highly resistant to irradiation. Although such treatment may cause some regression of the symptoms, Meyerding believes it is of value chiefly because, when it is given in conjunction with surgery, it relieves the pain. Studies in the larger clinics and data assembled by the Registry of Bone Sarcoma do not hold out much hope of permanent benefit from irradiation. Excision and amputation appear to be most beneficial. When the patient will not consent to operation, irradiation may be chosen. Meyerding is not impressed by the use of irradiation as a preliminary form of treatment. He believes that early diagnosis, radical surgical operation, postoperative roentgen-ray therapy, and the administration of toxins have given the most encouraging results.

Multiple myeloma presents a hopeless surgical problem, and irradiation gives only mildly encouraging results. When the disease is recognized early, relief of local symptoms and some retardation of growth with considerable improvement for a period of from one to two years is about all that can be expected. The disease is fatal in spite of any known treatment.

In cases of metastasis from carcinoma of the breast, thyroid gland, uterus, stomach, and prostate gland, the pain may be relieved to some degree and the rapidity of growth may be delayed by roentgen-ray therapy, but the generalized process goes on and benefit from the treatment is frequently questionable. These metastatic growths are often considered primary bone tumors, their nature remaining unrecognized until late in the disease or until autopsy is performed. Nevertheless, the author believes that the prolongation of life and relief of pain obtained by roentgen-ray therapy would cause anyone afflicted to choose this method of treatment.

It is obvious from experience extending over a period of years that roentgen-ray treatment of bone tumors is not a cure-all. The possibilities of irradiation have not been exhausted, and time will bring about greater improvement in its application and increase its therapeutic value. For improvement of the results surgeons and roentgenologists must continue to co-operate. When the family physician becomes able to make the diagnosis earlier and will then refer patients to centers where every aid is available, progress through further research will follow.

Merritt, E. A.: Radiation Therapy of Inoperable Intra-Abdominal Malignancy; With Special Reference to the Stomach. *Am. J. Roentgenol.*, 1936, 36: 324.

The author presents a brief historical review of the literature relating to roentgen irradiation of gastric malignancies and cites statistics which indicate that, save in exceptional cases, surgery alone offers little hope of cure. Early diagnosis is all-important. For cases in which the lesion is resectable, the author does not advocate irradiation.

The diagnosis can be made with a higher degree of accuracy by roentgen examination than by any or all other methods, but roentgen examination is of no aid in determining the radiosensitivity of the lesion. This may be ascertained by subjecting the patient to irradiation therapy for two or three weeks, and when it has been established this form of treatment may prove life-saving.

The author's contribution consists of a preliminary report on a series of 13 cases treated by irradiation since January, 1934. Four of the patients are still living. Three are apparently well and free of all evidence of disease, but 1 has roentgen signs of malignancy. The 9 others died of the disease. The cases were taken for treatment without regard to the condition of the patient or the extent of the involvement of the stomach. Most of the patients who succumbed were in a dying condition when treated. This was true also of 1 of the 3 who are living and well today. The treatments were very well tolerated. They were given daily, except Sunday, by the modified Coutard technique. The cases are tabulated as to age, sex, location of the lesion, survival after treatment, number of treatments, and tumor dose. Four of them are reported in detail with roentgenograms. ADOLPH HARTUNG, M.D.

Timpano, M.: The Immediate Results of Roentgentherapy with Fractionated and Prolonged Dosage in Malignant Tumors of the Female Genitalia (Primi risultati della röntgenterapia a dosi frazionate e protratte nei tumori maligni dei genitali femminili). *Radiol. med.*, 1936, 23: 673.

Timpano reports on 56 women with cancer of the genitalia treated at the Bergamo Radiological Institute in the period from 1932 to 1934 inclusive with fractionated and prolonged roentgen therapy, either alone or combined with radium. Thirty-two of the tumors were epitheliomas of the cervix; 5, epitheliomas of the vulva and vagina; 10, carcinomas of the body of the uterus; 6, recurrences in the cervix and body after irradiation therapy; and 3, cancers in the stump following hysterectomy. Almost all of the patients were inoperable. A number had cardiorenal insufficiency and 4 had syphilis. The total dose was from 6,000 to 9,000 r distributed over from 40 to 60 sessions. The treatment lasted from one and a half to two months.

Except in cases in the terminal stage, the immediate results were good. The long series of treatments were well tolerated. In some cases the general improvement was remarkable, and in a few it lasted for more than a year. Patients with very extensive lesions and in poor general condition showed only slight amelioration, and a distinctly unfavorable influence was noted in those who were obliged to return to poor home conditions and an insufficient diet. The analgesic effect was noteworthy in the less advanced cases, but slight in the last stages. In the cases of recurrence the treatment had almost no effect.

The results in the cases of the 32 patients regarding whom information was obtainable at the beginning of 1936 are analyzed in tabular form. Although they do not bear out the hopes aroused by the immediate results, they are nevertheless worthy of consideration. One of the 7 women treated for primary cancer (all sites) in 1932, 6 of the 13 treated in 1933, and 1 of the 5 treated in 1934 were still living. Of 7 treated for recurrent cancer between 1932 and 1934, all were dead. Two women operated upon for malignant tumors of the ovary in 1932 and 1934 respectively and afterward treated by irradiation were in excellent health.

There is no evident relationship between the total dosage and the therapeutic effect. Success depends less upon a large amount of irradiation than upon the extent, type, and sensitivity of the tumor and the general condition of the patient. The addition of radium to the x-ray therapy does not appreciably improve the late results.

Although the series of cases was too small and the observation period too short to warrant a definitive opinion on the results of roentgentherapy with high and prolonged dosage in this type of cancer, it at least proves that women with lesions belonging to Groups 3 and 4 are benefited by such treatment temporarily and that many of them survive for from one to two years in good general condition. M. E. MORSE, M.D.

Leucutia, T.: The Comparative Clinical Value of Supervoltage Roentgen Therapy. *Am. J. Roentgenol.*, 1936, 36: 350.

From the physical standpoint, roentgen therapy with supervoltages has at least 3 advantages over roentgen therapy with 200 kv. as there is an increase in the differential action due to better absorption conditions, a proportionately larger dose can be administered, and a greater percentage depth dose can be obtained with increasing voltages. Obviously, it will require time to determine whether the improvement in these physical factors is followed by similar improvement in the clinical effect. However, until comprehensive five-year statistics are published the problem may be analyzed on the basis of the comparative response of certain arbitrarily chosen tumors mostly cancerous in nature. Since it cannot be said that the general laws of radiosensitivity are influenced to any appreciable extent, it appears best to consider the anatomic location of such tumors since, after all, the enhanced therapeutic effect must be attributed to the better

irradiation conditions created by the more advantageous physical factors.

Superficial lesions. In this group are included malignant tumors of the skin and of structures lying very near the surface of the skin. In the great majority of these lesions superficial or deep roentgen therapy or a combination of both will yield satisfactory results. However, if the tumor is very bulky, rising 3 cm. or more above the surface or penetrating for a like distance into the deeper layers, supervoltage roentgen therapy, used alone or in association with the 2 other types of roentgen procedures in the form of "mixed irradiation" undoubtedly gives better results. Moreover, because of the more uniform distribution and larger percentage dose in the first 2- or 3-cm. layers beneath the surface and because of the greater tolerance of the skin, treatment through a single portal will appear sufficient in many cases in which, otherwise, cross-firing through several portals would be necessary.

Lesions about the face and neck. There is hardly any region of the human body which offers as complex a medium for heterogeneous irradiation as the face and neck. The anatomic structures in this region render the volume to be irradiated so variable in conformation and heterogeneous in density that exact calculation of a depth dose is impossible. Therefore here, too, supervoltage roentgen therapy, especially by the fractionated, protracted Coutard method, constitutes a step forward.

Intrathoracic lesions. Another group of lesions in which roentgen therapy with the former methods is most difficult is represented by tumors situated within the thoracic cage. On the one hand there is the necessity of using large doses and therefore cross-firing through several large fields, and on the other, there is the exceedingly great danger of producing fibrosis of the lung. As supervoltage roentgen therapy helps to solve these problems to a great extent, its use in cases of mediastinal tumor, bronchogenic carcinoma, and pleural malignancies is of decided benefit.

Pelvic and abdominal lesions. In this group of lesions the treatment is most effective in carcinoma of the cervix, sometimes even in advanced stages; next most effective in carcinoma of the ovary; and effective to a less degree in carcinoma of the prostate and rectum.

All in all, it appears that the addition of supervoltage roentgen therapy to the irradiation armamentarium represents an important step, the value of which grows more evident as statistical reports on the results are published.

RADIUM

Lomholt, S.: The Alpha and Beta Rays in Skin Therapy. *Proc. Roy. Soc. Med.*, Lond., 1936, 29: 1401.

Most radio-active elements give off 3 types of rays: the alpha rays, consisting of positively charged helium nuclei; the beta rays, negatively charged electrons; and the gamma rays, which are identical with very hard x-rays. The alpha and beta rays are corpuscular emissions. In radium, the alpha rays represent over 80 per cent of the total irradiation energy and the beta rays about 10 per cent. As both have a very energetic biologic effect which is limited to the tissues closest to the point of action, they may be used advantageously in superficial skin therapy.

Alpha rays. On account of the large size and the great electrical charge of the particles, alpha rays are barely able to penetrate a thick sheet of paper and are completely absorbed by a thin roil of aluminum. They can be used only in one form, namely, as a solution of thorium-X in propylalcohol or ointment which is painted on the lesion by means of a small metal applicator. Scales or crusts must be removed beforehand. After the alcohol has dried a thin layer of collodium may be applied. Because of the very superficial effect, there is no danger of injury. The author has repeated the application as many as 20 times over the same area without causing damage to the skin. Thorium-X is the remedy *par excellence* for the treatment of psoriasis, especially of the small spotted forms, and of some types of neurodermatitis.

Beta rays. On account of the smaller size and the smaller electrical charge of the particles, beta rays penetrate the skin a little better than the alpha rays. However, they do not penetrate more than a few millimeters. They may be applied by means of lacquered radium plaques, lightly filtered radium tubes or capsules, and various radium-emanation preparations. The author and Jacobsen use a radium-emanation plate which is obtained by suspending emanation tubes in melted wax. The glass of the tubes is crushed within the mass of the melted wax which, after cooling, is cut into plates 2 mm. thick and of various sizes and shapes. The strength of the irradiation is expressed in millicuries per square centimeter. As the emanation deteriorates about 16 per cent in twenty-four hours and there is an additional loss of 10 per cent due to evaporation, the plate must be tested after its production and applied only when its strength is known. A very common dose is from 0.7 to 0.9 mc.-hr. per square centimeters given with plates of from 0.02 to 0.1 mc. per square centimeter applied for from ten to thirty hours. Overdosage may cause permanent damage to the skin, although of only superficial nature. Beta irradiation is of value in most cases of psoriasis, in chronic neurodermatitis, in chronic infiltrated plaques of eczema, in nevus flammeus, in keloids, and in multiple warts. There should be an interval of from three to four weeks between the applications and not more than 4 treatments should be given over the same area except in cases of keloids.

From the use of alpha and beta rays in the treatment of skin lesions over a period of ten years the author concludes that the method is very easy, effective, and safe. T. Leucutia, M.D.

MISCELLANEOUS

Cramer, W.: Experimental Observations on the Rationale of Radiotherapy. *Lancet*, 1936, 231: 668.

The regression of a malignant new growth after irradiation is the result of a complex process which is initiated by damage to the tumor cells and is followed by a repair reaction on the part of the normal tissues which leads to gradual replacement of the tumor by young cellular connective tissue.

Malignant tumors in general are no more radiosensitive than normal tissues in general. Both show very high radiosensitivity and very high radioresistance. The reason is not entirely clear. It seems incorrect to attribute all differences to the variation in the blood supply alone.

The radiosensitivity of malignant cells can be varied. In the absence of oxygen, such cells become very radioresistant. On the other hand, their radiosensitivity can be greatly increased by inhibiting respiration either by HCN or by cold. It appears that if the vascular connective tissues surrounding the tumor are damaged by repeated irradiation the malignant cells pass into a stage of partial anerobiosis which renders them radioresistant.

The damage inflicted on cells of transplantable tumors by sublethal doses of radium persists for some time, but is completely reversible. This is of great importance in connection with the rationale of the fractionated method of radiotherapy. It appears that the period of recovery of malignant cells from very small doses is very much longer than that of normal tissues. This is rather surprising since formerly it was thought that the effect of small doses of irradiation passes off very rapidly. At any rate it explains the success of the Coutard method in man since, by applying very small doses of irradiation at suitable intervals, it becomes possible to produce a cumulative effect in a tumor with a noncumulative or much less cumulative effect in the skin and thus to bring about a selective action on the malignant tissue.

The experiments were carried out with transplantable mouse carcinoma, Strain 2146 (a polymorphous skin carcinoma originally produced by tar painting) which always takes when transplanted, grows very rapidly, and practically never undergoes spontaneous regression. Two types of irradiation were used—a mixture of hard beta and gamma rays in one series and gamma rays alone in another. The effect was estimated by studying the rate of growth and the length of recovery of the tumor cells. The technical procedure is described in detail and the results of the experiments are shown graphically.

T. Leucutia, M.D.

Locher, G. L.: Biological Effects and Therapeutic Possibilities of Neutrons. *Am. J. Roentgenol.*, 1936, 36: 1.

In a brief general discussion of the nature and behavior of neutrons, Locher cites the fact that elements may be made radio-active artificially by neutron bombardment. He states that the possibility of applying such radio-active elements to biological research and irradiation therapy has aroused much interest, and that this field will doubtless be explored as fast as experimental facilities can be established and experiments performed.

He discusses the biological effects expected from neutron irradiation at length. These are of 2 kinds: (1) effects produced in the bulk of tissue as the result of elastic collisions of neutrons, especially those with hydrogen nuclei; and (2) effects produced in specific regions where even small concentrations of highly absorbing atoms are present. In either case the ionizing action which arises from neutron bombardment, like that from gamma and roentgen irradiation, will probably be chiefly destructive and hence applicable to such problems as the production of mutations in animals and plants and the destruction of malignant cells.

The action of neutrons differs conspicuously from that of other irradiations in that: (1) its effects are, broadly speaking, greatest in light elements, particularly hydrogen, whereas those of the gamma type of irradiation, for example, are greatest in heavy elements; (2) the scattering of neutrons by hydrogen results in the production of short-range, but highly ionizing particles in contrast to the long-range, low-ionizing paths of electrons ejected by gamma rays; and (3) slow neutrons can be subjected to strong selective absorption by certain elements and this absorption may result in the spontaneous release of atomic energy from the atoms in which absorption occurs.

In discussing the physical problems that must be solved before it will be possible to calculate the exact amount, form, and distribution in which energy will be liberated in any given mass of material irradiated with a neutron beam from a (practical) source of neutrons, the author cites the necessity for:

1. The development of simple and reasonably accurate means of measuring the number of neutrons per second in any beam, and the distribution of their velocities.

2. Determination of the ratios of nuclear absorption (true absorption) and scattering for different elements and for neutrons of various energies.

3. Further studies of the scattering of neutrons of various velocities by various substances to determine the mean free paths between successive collisions under various conditions.

4. Further investigation of the processes and energy relations in nuclear transformations to determine for each element what processes occur, what isotope is involved, the kinds and energies of the particles and quanta emitted by the elements so disintegrated, and the influence of the velocities of the neutrons on these processes.

In the field of application of neutrons to experimental biology investigation must be carried out with regard to:

1. The bulk effects of neutrons in living tissue.

2. Destruction or enfeeblement of living bacteria by neutrons.

3. Specific effects in organs or other special tissues of higher animals subjected to slow neutron bombardment.

4. The efficacy of neutrons in producing mutations in animals and plants.

In the field of medical research it is necessary to investigate:

1. The possibility of destroying or weakening cancerous cells by general or selective absorption of neutrons by these cells.

2. The possibility of obtaining a specific destructive action of slow neutrons on disease-producing bacteria.

The author discusses in detail the means of producing neutrons. Three methods that are feasible for obtaining them at rates exceeding a million per second are: (1) bombardment of beryllium with alpha particles from radium or radon; (2) irradiation of beryllium with hard gamma rays; and (3) bombardment of various elements with high-velocity deuterons generated in high-voltage machines.

In discussing the handling of neutrons, Locher considers protection, measurement, and filtration. He states that the problems of protection are analogous to those of protection against gamma-ray and roentgen-ray burns. Measurement of the intrinsic characteristics of a beam of neutrons is difficult and at best merely an approximate determination of the energy flux. The measurement may be made by means of: (1) paraffin-lined ionization chambers; (2) thin ionization chambers arranged with very sensitive linear amplifiers; (3) methods using artificial radio-activity induced by neutrons; (4) nuclear disintegrations in photographic plates; (5) Wilson cloud chambers; and (6) chemical measurement.

With regard to filtration there remain many problems which must be solved in order that desired beams of neutrons may be obtained from heterogenous beams. Various thicknesses of paraffin have been found of value in the slowing down of neutrons, but the most appropriate scatterers for neutron sources of various energy maxima and energy distributions are yet to be determined.

ADOLPH HARTUNG, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Smelo, L. S.: The Problem of Wound Healing: I. The Effect of Local Agents. *Arch. Surg.*, 1936, 33: 493.

The author reviews the literature on the management of traumatic wounds and our present knowledge of the processes of repair. He states that the immediate question confronting the surgeon is whether or not means are available to act on the reparative process in a stimulating manner.

Variables which may influence healing from a distance are diet, hormones, and infection existing elsewhere in the body. Among the local factors of importance are the degree and type of infection, the presence of foreign bodies, the trophic state of the tissues, and the amount of traumatism associated with dressing.

Among the agents purported to influence the course of wound healing favorably through local action are physical agents, embryonic extract, antigenic substances, and certain hormones, vitamins, and stimulants.

The author believes that the methods usually employed for the evaluation of stimulants to repair are not reliable. For more accurate evaluation he advocates a quantitative approach.

He reports a study of 16 patients whose wounds were surgically clean. Each wound was dressed with 2 or more of the substances under investigation during alternate periods of varying duration. Measurements of changes in area and in volume were made at frequent intervals and cultures were taken from time to time. From the data thus collected a curve showing the course of healing under the successive local dressings was plotted for each wound.

The substances studied by the technique outlined were divided into 3 groups:

1. Admittedly inert agents: petrolatum gauze, physiologic solution of sodium chloride, and dry gauze dressing.

2. Antiseptic agents: a 1:1,000 solution of merthiolate, a 1:2,000 merthiolate ointment, a 4 per cent solution of mercurochrome, a paste made of zinc peroxide and water, and a paste consisting of zinc oxide, acacia, and glycerin.

3. Presumably stimulating agents: 0.25 per cent thiocresol in solution and in ointment, irradiated petrolatum, a 0.6 per cent solution of allantoin, peruvian balsam, and ultraviolet irradiation.

The author reports 5 cases with curves of healing showing how each substance affected the wound.

In wounds which healed, comparison is made between the effect of merthiolate ointment and that of petrolatum gauze, which was used as the control, and between the effect of a solution of merthiolate and that of physiologic solution of sodium chloride, which was used as the control. The author concludes that a decided effect on healing can hardly be attributed to any of these 4 agents. Dry gauze dressing, mercurochrome, and thiocresol ointment appeared to exert a somewhat detrimental action. In a number of wounds which had been cicatrizing steadily during several successive periods of observation the application of mercurochrome coincided with definite retardation in the rate of healing. In 10 periods of observation on 3 patients treated with thiocresol dressings healing was accelerated only once, was retarded 5 times, and was of average velocity 4 times. No single substance proved of outstanding worth or was particularly detrimental to repair.

In the study of non-healing wounds a similar conclusion was reached. However, not every agent had the same effect on healing and non-healing wounds. Although in healing wounds both merthiolate ointment and merthiolate solution were somewhat superior to their controls, petrolatum gauze and physiologic solution of sodium chloride, in non-healing wounds their action appeared divergent, the ointment having a favorable influence and the solution an unfavorable influence as compared with the controls. The author concluded that in non-healing wounds, just as in healing wounds, the agents tested by local application did not significantly affect repair. Moreover, he has found that no antiseptic ever sterilized or even significantly altered the cultural characteristics of any of the wounds studied.

In studies of the effect of merthiolate on tissue *in vitro* he found that under the experimental conditions established, dilutions of merthiolate up to 1:100,000 invariably killed the staphylococcus aureus in the culture medium alone whereas, in the presence of explants of skin from a chick embryo cultivated in a liquid medium, a concentration of 1:20,000 was required to kill this organism. Concerning the effect of merthiolate on the explant alone it was observed that dilutions up to 1:600,000 invariably killed the explant. These observations demonstrate that merthiolate has a more toxic action on connective tissue and epithelial cells than on bacteria, but most striking is the marked decrease of its antiseptic potency produced by the concomitant presence of tissue and micro-organisms.

HARVEY S. ALLEN, M.D.

Warren, S., and Sommer, G. N. J., Jr.: Fibrosarcoma of the Soft Parts, with Special Reference to Recurrence and Metastasis. *Arch. Surg.*, 1936, 33: 425.

Warren and Sommer review a series of 163 cases of fibrosarcoma. These tumors represent a cross-

section of fibrosarcomas encountered in practice. The great majority of the patients were followed to the time of their death or for at least three years.

Fibrosarcoma is not a disease of young persons. The mean age at onset of the symptoms in both sexes is about fifty years. Its incidence in decades is not very different from that of carcinoma, and its incidence in males and females is about equal.

The diagnosis is frequently delayed because, as pain is not an early symptom, the patient does not seek relief promptly. Swelling is usually the first sign, and in many cases the condition is superficial in the earlier stages. For some time the tumor may be freely movable. Examination of the gross specimen usually shows a pale, fibrous, somewhat infiltrating tumor tending to expand the surrounding structures and showing varying degrees of vascularity. Necrosis is not nearly so marked a feature as in epithelial tumors. Hardness is frequently absent.

Trauma is not an etiological factor.

In most of the cases reviewed the tumor was treated surgically. The operations varied from local to radical excision. In cases of tumor of the extremities the latter was sometimes amputation. Operation was most successful when excision was done with wide margins below as well as laterally. A small proportion of the patients received postoperative treatment with the roentgen rays and radium, but in none did the irradiation have any notable influence on the course of the disease. In several instances recurrences progressed in spite of irradiation therapy. The interval from the onset of symptoms to the beginning of treatment bore no definite relation to the outcome.

The authors regard the classification of fibrosarcomas as a difficult problem. They recognize neurogenic fibrosarcoma as a definite subtype. Their criterion of a high degree of malignancy has been the presence of a fair to marked number of tumor giant cells. The number of such cells often parallels mitotic activity fairly closely. However, the neurogenic tumor with tumor giant cells is not strikingly different in behavior from a growth without such cells.

As recurrence developed in over a third of the cases reviewed (64), it is obvious that local removal is often insufficient. If recurrence takes place, it usually occurs within a year. In cases with recurrence the prognosis is grave, but 8 of the patients are alive and well three years after treatment of a recurrence.

Metastasis occurred in 34 of the reviewed cases. In only 6 did it precede local recurrence. The viscera most frequently involved were the lungs. Metastasis of sarcoma to lymph nodes occurs occasionally.

The location of the tumor may be of more importance than its histologic type. Fibrosarcomas of the head are particularly malignant and difficult to treat. Of 24 patients treated for fibrosarcoma of the head, only 21 per cent are living without disease after three years. In the cases of well-differentiated neurogenic fibrosarcoma of the head the average duration of the disease was twice as long as the duration in the cases of fibrosarcoma of the head and 10 times as long as that in the cases of sarcoma with tumor giant cells.

Of 62 patients with sarcoma of the extremities, only 24 per cent are living and well three or more years after the onset.

The authors discuss also 38 cases of sarcoma of the trunk, 12 of fibrosarcoma within the abdomen and of the genitalia, 17 of adenofibrosarcoma of the breast, and 5 of desmoids. Of the 17 patients with adenofibrosarcoma of the breast, 16 have recovered. Of 8 subjected to radical resection of the breast, none showed any evidence of involvement of the lymph nodes. The authors believe that simple amputation of the breast with removal of the fascia overlying the pectoralis muscle is the method of choice.

Five fibrosarcomas of special interest are discussed in detail. Two of these developed on the basis of roentgen and radium burns.

HARVEY S. ALLEN, M.D.

Pentimalli, F.: Dialysis of the Perfusion Liquid of Chicken Sarcoma (Dialisi del liquido di perfusione del sarcoma del pollo). *Tumori*, 1936, 22: 327.

In a previous article Pentimalli differentiated spectroscopically the absorption band of the perfusion liquid of a tumor from that of blood plasma. In the course of the experiments, however, he found that in the perfusion liquid there are many other substances which contribute to the absorption and may mask the absorption band and thus the presence of the protein substance. In order to eliminate these interfering substances he resorted to dialysis through a series of membranes such as cellophan or collodion tubes. The dialysis was always carried out with a 0.9 per cent sodium chloride solution at room temperature.

For successful experimentation the tumors must have been transplanted recently and must grow rapidly. Slowly growing or necrotic tumors should be discarded.

In his experiments Pentimalli found that a perfusion liquid of chicken sarcoma, which spectroscopically shows a generic absorption band with neither a maximum nor a minimum when dialyzed through a cellophan tube against a 0.9 per cent solution of sodium chloride, shows an absorption band with a maximum wave length of $\lambda = 2750$ Å and $\lambda = 2760$ Å. This is due to the elimination during dialysis of all substances which generically participate in absorption. The absorption band corresponds to a protein and may be clearly demonstrated when its concentration in the perfusion liquid is not less than 1 mgm. per cent.

The absorption band is directly proportional to the biologic activity of the liquid in the sense that a clear and pronounced band of absorption corresponds, after inoculation into an animal, to a con-

siderable tumor growth. However, the absence of an absorption band does not exclude tumor formation if the liquid is inoculated into an animal because tumors may form also after the inoculation of liquids with a protein content as low as from 0.3 to 0.4 mgm. per cent. With these minimal concentrations, absorption bands cannot be demonstrated, not even after dialysis.

As the perfusion liquid loses a considerable part of its activity during dialysis, it is assumed that the active group must also be present in the diffusible fraction. Following dialysis there is therefore a loss of residual nitrogen.

Accordingly, the most plausible theory is that the agent is not identifiable with a protein but is present in the perfusion liquid, in part free and in part absorbed by the protein. The latter acts as a vector or support, or as a colloidal part of the active group.

RICHARD E. SOMMA, M.D.

DUCTLESS GLANDS

Merritt, E. A., and Lattman, I.: X-Ray Treatment in Hyperparathyroidism. *Radiology*, 1936, 26: 673.

In 1933 Merritt reported a series of cases of hyperparathyroidism treated by X-ray irradiation. Since 1931 he and Lattman have treated a comparatively large number in this manner. They believe that the occurrence of pathological fractures in the absence of malignancy or an unexplained cystic bone disease warrants at least a therapeutic test of irradiation over the cervical area. The purpose of the irradiation is to produce an inhibitory effect on the function of the parathyroids. Surgery in these conditions is not a simple procedure, as frequently the tumor is difficult to find or no tumor is present. The location and number of the lesions is not constant. In cases in which enormous doses of irradiation have been administered for malignancy in the neck region tetany and myxedema have not occurred. The authors believe that in all cases of diagnosed or suspected hyperparathyroidism X-ray therapy should be given a trial before surgery is undertaken.

The X-ray findings in a typical case of hyperparathyroidism are characteristic. They consist of decalcification associated with multiple cystic areas and a uniform granular mottling, particularly in the skull. The cysts found are most commonly at the site of most active growth, the metaphysis. The vertebræ show decalcification and flattening and are often compressed. An increase in the serum calcium and a decrease in the serum phosphorus are not constant findings. Pain in the affected bones is a common complaint. Deposits of calcium are sometimes discovered in the kidneys and lungs.

The factors in the authors' irradiation technique are: an anterior cervical portal measuring 15 by 15 cm., which extends from the chin to the sternum; 220 kv.; 20 ma.; filtration with 0.5 mm. of copper; and a distance of 50 cm. Two hundred and fifty roentgens are given daily for four successive days. After a period of three weeks the series is repeated. Usually two or three series are sufficient, but in some cases four or five may be necessary.

In many cases the pain decreases or ceases after the first treatment. Regeneration of bone is usually noted from two to four weeks after the first series of irradiations. Also after the first series the general condition improves markedly and the blood calcium and phosphorus, if disturbed, usually return to normal.

The authors report seven cases in which the results were uniformly good. EARL E. BARTH, M.D.

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NOTE—THE BOLD FACE FIGURES IN BRACKETS AT THE RIGHT OF A REFERENCE INDICATE THE PAGE OF THIS ISSUE ON WHICH AN ABSTRACT OF THE ARTICLE REFERRED TO MAY BE FOUND.

SURGERY OF THE HEAD AND NECK

Head

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